

SCIENCE

Main Book

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Theme 3

Protecting Our Planet



Unit 3 Natural Resources on Earth's Surface

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Concept 1 Biosphere and Hydrosphere Interactions

Concept 2 Water as a Valuable Natural Resource

Unit Project We All Live Downstream

Get Started
What I Already Know

Conserving Water

- Most of the Earth's surface is covered with water.
- Water is found everywhere on Earth, where it is found in oceans, seas, rivers, lakes, and underground.
- Fresh water is important for all living organisms to survive.

• معظم سطح الأرض مُغطى بالماء.
• توجد المياه في كل مكان على الأرض؛ حيث توجد في المحيطات والبحار والأنهار والبحيرات وتحت الأرض.
• الماء العذب مهم جدًا لبقاء جميع الكائنات الحية.



- Climate change, pollution, and water waste threaten the supply of water for many people.

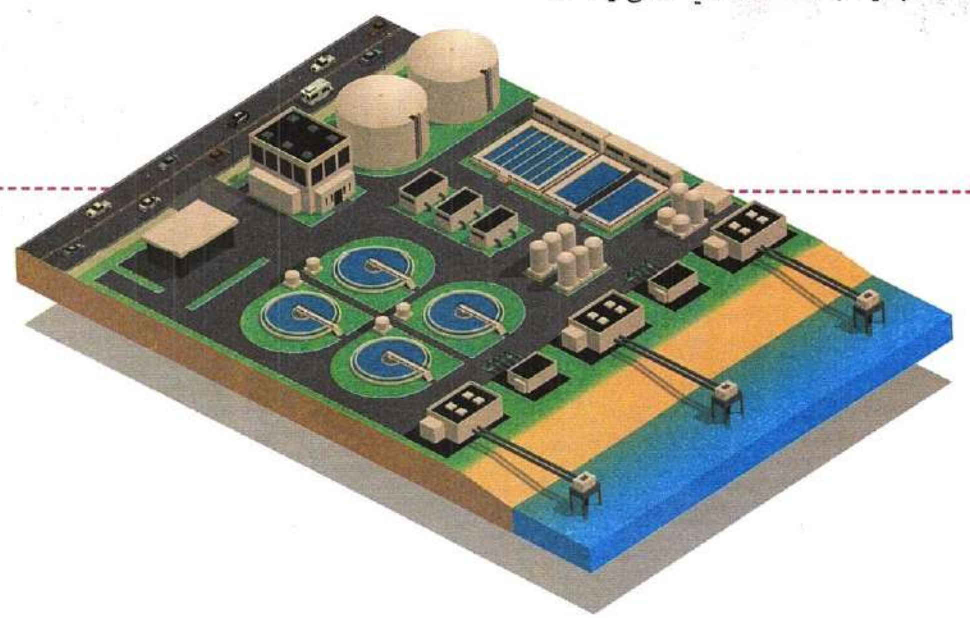
• يَستخدم الإنسان المياه في العديد من الأغراض، مثل: الشرب وطهي الطعام والتنظيف والاستحمام.
• يُهدِّد تغيُّر المناخ والتلوث وإهدار المياه إمدادات المياه العذبة للكثير من البشر.

Recycling of Wastewater

Recycling of wastewater is one of the solutions to conserve freshwater resources.

- Water that we use for washing and showering can be filtered and cleaned, then used again for other purposes.
- The Bahr Al-Baqar wastewater treatment plant in Egypt is one of the largest water treatment plants in the world.
- Water treated there can be used to irrigate farms in Egypt.

- أحد الحلول لهذه المشكلة هو إعادة تدوير مياه الصرف الصحي.
- المياه التي نستخدمها للغسيل والاستحمام يمكن تنقيتها؛ ومِنْ ثَمَّ استخدامها مرة أخرى لأغراض أخرى.
- تعتبر محطة بحر البقر لمعالجة مياه الصرف الصحي في مصر من أكبر محطات معالجة المياه في العالم.
- المياه المعالجة يمكن استخدامها لري المزارع في مصر.



In this unit, you are going to study:

- How do the resources of Earth's spheres interact with each other?
- How much water is found on Earth?
- How can we protect the Earth's resources?



Concept 1

Biosphere and Hydrosphere Interactions

Concept Objectives:

By the end of this concept, students will be able to:

- Classify systems on Earth as parts of the hydrosphere, biosphere, geosphere, and atmosphere.
- Develop a model of interactions between the hydrosphere and the biosphere.
- Identify defining characteristics of different aquatic ecosystems.

Key Vocabulary:

- Ecosystem
- Atmosphere
- Hydrosphere
- Geosphere
- Fresh water
- Salty water
- Groundwater
- Biome
- Biosphere

Concept 1

Biosphere and Hydrosphere Interactions

Lesson 1




Activity 1 Can You Explain?

» The Earth is a complex system that consists of living organisms and nonliving things that interact with each other.

Scientists divided the Earth into four main systems (spheres).

Biosphere

It's the system that includes all living organisms.

- Humans
- Animals
- Plants

Hydrosphere

It's the system that includes all water on the Earth.

- Fresh water
- Salt water

Geosphere

It's the system that includes:

- Rocks.
- Soil.
- Sand.

Atmosphere

It's the system that is composed of a mixture of gases.

- Oxygen
- Nitrogen
- Carbon dioxide
- Water vapor

• الأرض عبارة عن نظام مُعقَّد يتكوَّن من كائنات حية وكائنات غير حية تتفاعل مع بعضها البعض.

• **قام العلماء بتقسيم الأنظمة الرئيسية للأرض إلى ٤ أقسام (أغلفة) رئيسية:**

– **الغلاف الحيوي:** الذي يشمل جميع الكائنات الحية، مثل: الإنسان والحيوانات والنباتات.

– **الغلاف المائي:** الذي يشمل جميع المياه على سطح الأرض، مثل: المياه العذبة والمياه المالحة.

– **الغلاف الأرضي:** الذي يشمل الصخور والتربة والرمال.

– **الغلاف الجوي:** الذي يتكوَّن من خليط من الغازات (الأكسجين – النيتروجين – ثاني أكسيد الكربون – بخار الماء).




Unit 3

Activity 2 Water's Impact on Living Organisms

1 How do living organisms use water?

» All living organisms need water to drink, grow, and survive.

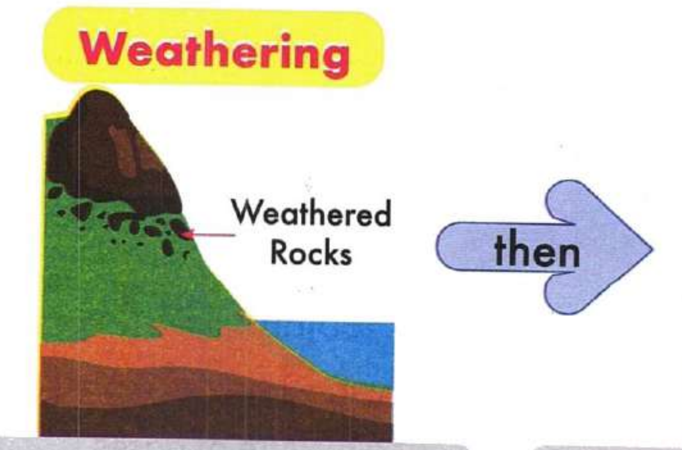




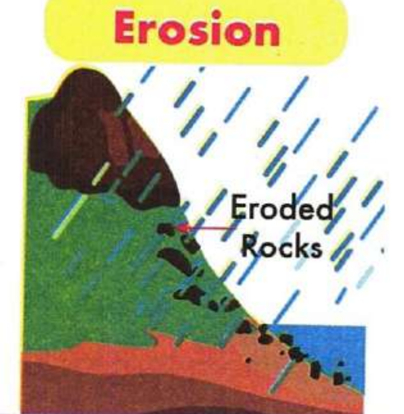
2 How does water affect nonliving things?

» Water has an impact on the Earth's surface through two processes:

Weathering



Erosion



It is the process of breaking down of rocks into smaller particles.

التجوية: هي عملية تكسير وتفتيت الصخور إلى قِطَع صغيرة.

It is the process of transportation of small particles of rocks from a place to another.

التعرية: هي عملية نقل الصخور الصغيرة من مكان لآخر.

Check your understanding?

» **Put (✓) or (✗):**

1. Living organisms can survive without water. ( )
2. The process of transportation of weathered rocks is called weathering. ( )





Activity  3 The Importance of Water for Life on Earth

- Water is everywhere in lakes, rivers, seas, oceans, and underground.



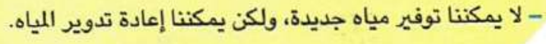
- Earth looks like a blue marble from the space.
- Nearly three-quarters of the Earth is covered by water.

• يشبه كوكب الأرض الكرة الزرقاء عند النظر إليه من الفضاء.
• تغطي المياه أكثر من ثلاثة أرباع الكوكب.

The Amount of Water on Earth

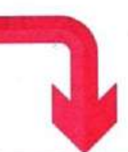


- The total amount of water on Earth does not change, even if its state changes.
- We can recycle water, but we cannot make new water.



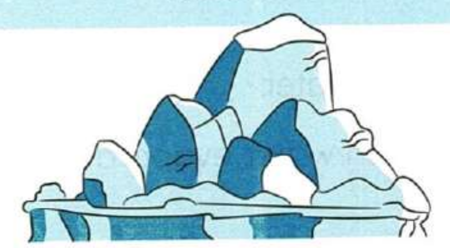
• هل تتغيَّر الكمية الإجمالية للمياه على الأرض؟
– لا تتغير الكمية الإجمالية للماء على سطح الأرض حتى لو تغيرت حالته من صورة لأخرى.
– لا يمكننا توفير مياه جديدة، ولكن يمكننا إعادة تدوير المياه.

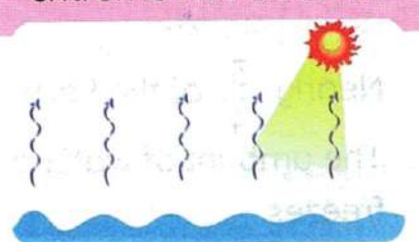




Water (liquid)

can change to ice (solid) by freezing in extreme cold weather.	can change to water vapor (gas) by evaporation in extreme hot weather.





Importance of Water

1. • Humans and animals drink water to survive.



2. • Plants need water to grow.



3. • Some animals and plants live in water.





Check your understanding?

» Put (✓) or (X):

1. Nearly $\frac{3}{4}$ of the Earth is covered by water. (   )
2. The amount of water decreases when water evaporates or freezes. (   )

Exercises on Lesson 1

1 Choose the correct answer:

1. Earth is divided by scientists into .... main spheres.
   a. three b. two c. four d. eight
2. Which of Earth's systems includes all of the Earth's water?
   a. Hydrosphere b. Biosphere c. Geosphere d. Atmosphere
3. .... is the system that includes rocks and heavy metals.
   a. Hydrosphere b. Biosphere c. Geosphere d. Atmosphere
4. Which of the following does NOT belong to the biosphere?
   a. Grass b. Humans c. Clouds d. Fish
5. .... are/is NOT component(s) of the geosphere.
   a. Rocks b. Soil c. Sand d. Oceans
6. All the following are components of the atmosphere, except ....
   a. oxygen b. nitrogen c. metals d. water vapour
7. Rocks are broken down into smaller particles during .... process.
   a. photosynthesis b. weathering c. erosion d. respiration
8. Water covers nearly .... of the Earth's surface.
   a. $\frac{1}{2}$ b. $\frac{3}{4}$ c. $\frac{1}{5}$ d. $\frac{1}{4}$
9. Which process describes the change of water into ice?
   a. Freezing b. Condensation
   c. Evaporation d. Melting
10. .... occurs when water changes into a gaseous state.
    a. Freezing b. Condensation
    c. Evaporation d. Melting
11. Water is used in all the following purposes, except ....
    a. recreation b. burning
    c. bathing d. manufacturing
12. .... are parts of the geosphere.
    a. Plants b. Rocks
    c. Gases d. Bodies of water

13 All the following need water to survive, except ....

a. animals
b. humans
c. plants
d. rocks

14 Where can parts of the hydrosphere and biosphere be found?

a. Only on the land
b. Only in the ocean
c. Only in the rainforest
d. Everywhere in the world

2 Put (✓) or (✗):

1 Earth is a complicated system that contains only living organisms.( )

2 Water on the Earth is divided into fresh water and salt water. ( )

3 The Earth's systems are divided into three systems: the atmosphere, biosphere, and hydrosphere. ( )

4 Rocks may be weathered and then eroded by the effect of water. ( )

5 The biosphere includes all living organisms, except plants. ( )

6 The total amount of water on the Earth is constant. ( )

7 There are no living organisms living in the hydrosphere. ( )

8 We cannot make new water, so we need to recycle it. ( )

9 Water evaporates in extreme cold weather. ( )

3 Write the scientific term:

1 It's one of the Earth's systems that includes the gases surrounding the Earth. (............)

2 It's the system that includes humans, animals, and plants on Earth. (............)

3 It's the process of the transportation of small, broken rocks from one place to another. (............)

4 It's the process of breaking down large rocks into smaller rocks. (............)

Concept 1

4 Complete the following using the words between the brackets:

(biosphere - cleaning - bathing - water - gases - geosphere)

1. Rocks can be weathered or eroded by ....
2. The atmosphere is a mixture of ....
3. Rocks of the Earth's surface belong to the ....
4. All living organisms belong to the ....
5. We can use water in .... and ....

5 Correct the underlined words:

1. The Earth looks like a <u>green</u> marble from space. (................)
2. <u>Land</u> occupies about three-quarters of the Earth. (................)
3. The <u>amount</u> of water changes during the evaporation process. (................)
4. Rocks and sand belong to the <u>biosphere</u>. (................)
5. The oxygen in the air is a part of the <u>geosphere</u>. (................)
6. When water freezes, it changes into <u>water vapor</u>. (................)

6 Cross out the odd word:

1. Hydrosphere - Biosphere - Atmosphere - Erosion (................)
2. Humans - Trees - Water - Animals (................)
3. Oxygen - Rocks - Carbon dioxide - Nitrogen (................)

7 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 The layer of gases, such as oxygen and nitrogen,	a. belong to the hydrosphere.
2 Salt water and fresh water	b. are from the components of the geosphere.
3 People, animals, and plants	c. is considered as the atmosphere.
4 Rocks, sand and soil	d. belong to the biosphere.

1 .... 2 .... 3 .... 4 ....

8 Study the following figure, then answer the questions below:

1. The part number .... belongs to the hydrosphere where living organisms can live.
2. Component number (.........) is a part of the geosphere.
3. Component number (.........) is a part of the atmosphere.
4. Component number (.........) is a part of the biosphere.
5. What happens to component number (4) when the weather becomes extremely cold?

....

9 Give reasons for:

1. The Earth looks like a blue marble from the space.

....

....

2. Water has an impact on rocks of the Earth's surface.

....

....

3. Water is important for both animals and plants.

....

....

10 What happens to:

1. The water of a lake when the weather gets extremely hot?

....

....

2. The biosphere when there's no hydrosphere on the Earth?

....

....




Lesson 2

Activity 4 What Do You Already Know About Hydrosphere and Biosphere Interactions?

In this activity, we are going to study the differences between some bodies of water.



Oceans and Seas
المحيطات والبحار

- They are very large bodies of salt water.

• البحار والمحيطات هي مسطحات مائية هائلة من الماء المالح.



Lakes
البحيرات

- They are bodies of water surrounded by land.
- Lakes are often fresh, but sometimes salty.

• البحيرة هي مسطح مائي محاط باليابسة من جميع الجهات.
• مياه البحيرات غالبًا ما تكون عذبة، ولكن في بعض الأحيان تكون مالحة.



Rivers
الأنهار

- They are bodies of water that always flow from an area of high altitude to an area of lower altitude in a definite channel.
- Rivers always contain fresh water.

• النهر هو الماء الذي يتدفق من منطقة عالية الارتفاع إلى منطقة منخفضة الارتفاع في قناة محددة. • مياه الأنهار دائمًا تكون عذبة.



Groundwater
المياه الجوفية

- It is the water that lies beneath (under) the Earth's surface and has been absorbed into the Earth through a layer of porous rocks.

• المياه الجوفية هي المياه التي تقع تحت الأرض وتم امتصاصها في الأرض من خلال طبقة الصخور المسامية.

Unit 3

Renewable resources:

- They are natural resources that can be replaced.

Renewable Resources

1 Water



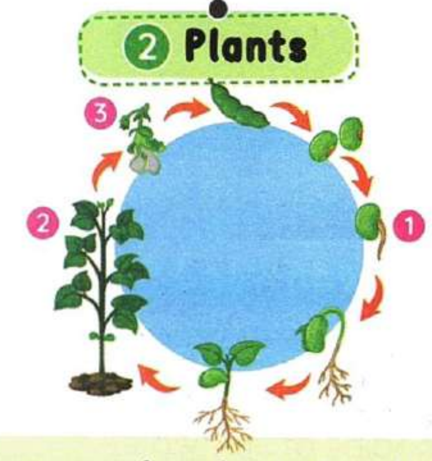
Water is renewed in nature during the water cycle, as follows:

1. Water in bodies of water evaporates by the Sun.
2. Water vapor condensates, forming clouds.
3. Water returns to bodies of water in the form of rain, and so on.

- يعاد تدوير الماء في الطبيعة خلال دورة الماء كالتالي:

1. يتبخر الماء من المسطحات المائية بفعل الشمس.
2. يتكثف بخار الماء مُكوِّنًا السحب.
3. يسقط الماء على هيئة أمطار وهكذا.

2 Plants



Plants can be planted and reproduced, as follows:

1. A planted seed grows, forming a new plant.
2. The new plant produces flowers.
3. The flowers produce seeds that can be planted again.

- تنمو النباتات وتتكاثر باستمرار كالتالي:

1. تنمو بذور النباتات لتكون نباتات جديدة.
2. تنمو النباتات وتكون أزهارًا.
3. تنتج الأزهار بذورًا مرة أخرى.

Check your understanding?

» Put (✓) or (✗):

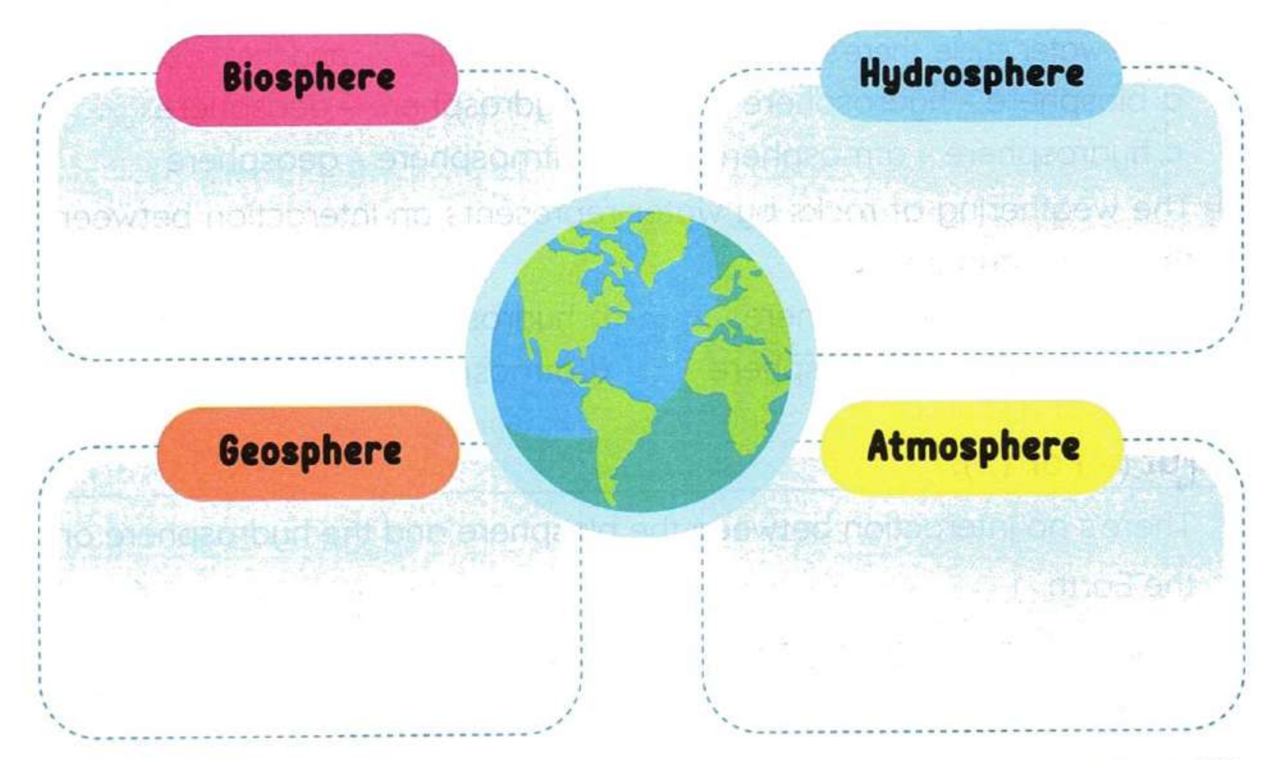
1. Rivers always contain fresh water. ( )
2. A lake is a land surrounded by water. ( )



Activity 5 What Is in Your Environment?

» Observe the following figure, then try to classify the given items into the four Earth's systems.

Tree
Bird
Oxygen
Plants
Water vapor
Human
Rocks
Water
Fish
Butterfly
Ground
Flowers



Exercises on Lesson 2

1 Choose the correct answer:

1. The water lies beneath the Earth's surface is called ....
   a. sea water b. groundwater c. frozen water d. river water
2. .... always contain fresh water only.
   a. Seas b. Oceans c. Lakes d. Rivers
3. .... is a body of water that is surrounded by land.
   a. A lake b. An island c. A river d. An ocean
4. Water and plants are similar in being ....
   a. part of the biosphere b. part of the hydrosphere
   c. renewable resources d. nonrenewable resources
5. The oxygen we breathe is a part of the Earth's ....
   a. hydrosphere b. biosphere c. atmosphere d. geosphere
6. Mountains are made of rocks, so mountains are part of the Earth's ....
   a. hydrosphere b. biosphere c. atmosphere d. geosphere
7. All the following belong to the hydrosphere, except ....
   a. rivers b. rocks c. oceans d. lakes
8. In the water cycle, there's an interaction between the .... and the .... on Earth.
   a. biosphere – hydrosphere b. hydrosphere – geosphere
   c. hydrosphere – atmosphere d. atmosphere – geosphere
9. The weathering of rocks by water represents an interaction between the .... and the ....
   a. biosphere – hydrosphere b. hydrosphere – geosphere
   c. hydrosphere – atmosphere d. atmosphere – geosphere

2 Put (✓) or (✗):

1. There's no interaction between the biosphere and the hydrosphere on the Earth. (   )
2. Evaporation occurs only to the salt water of oceans and seas. (   )
3. All lakes contain fresh water. (   )

4. An ocean is a small body of water that contains salt water. ( )
5. The Earth's systems don't interact with each other. ( )
6. Plants depend on the hydrosphere of Earth to grow and survive.( )
7. Groundwater that lies below the Earth's surface is part of the geosphere. ( )
8. When the groundwater leaks between rocks of the Earth's surface, there's an interaction between the geosphere and the hydrosphere. ( )
9. A river always flows from an area of low place to an area of higher place. ( )

3 Write the scientific term:

1. It's a body of water that always contains fresh water. (..........)
2. It's a body of water that is surrounded by land. (..........)

4 Complete the following using the words between the brackets:

(biosphere - water cycle - land - Rain - condensates)

1. The .... is responsible for maintaining the water amount constant on Earth.
2. When water vapor ...., it forms clouds.
3. .... belongs to the hydrosphere, while plants belong to the ....
4. A lake is a body of water that is surrounded by ....

5 Correct the underlined words:

1. Seas and oceans always contain <u>fresh</u> water. (..........)
2. Wind is considered part of the <u>geosphere</u>. (..........)
3. Rainwater is part of the <u>atmosphere</u>. (..........)

Unit 3

6 Cross out the odd word:

1. Oceans – Seas – Rivers – Rocks (..................)
2. Wind – Rain – Oxygen – Carbon dioxide (..................)
3. Insects – Water – Birds – Trees (..................)

7 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Lakes	a. are large bodies of water that contain salt water.
2 Oceans	b. may contain fresh water or salt water
3 Groundwater	c. flow from a high-altitude region to a lower one in a definite channel.
4 Rivers	d. is the water that lies under the Earth's surface.

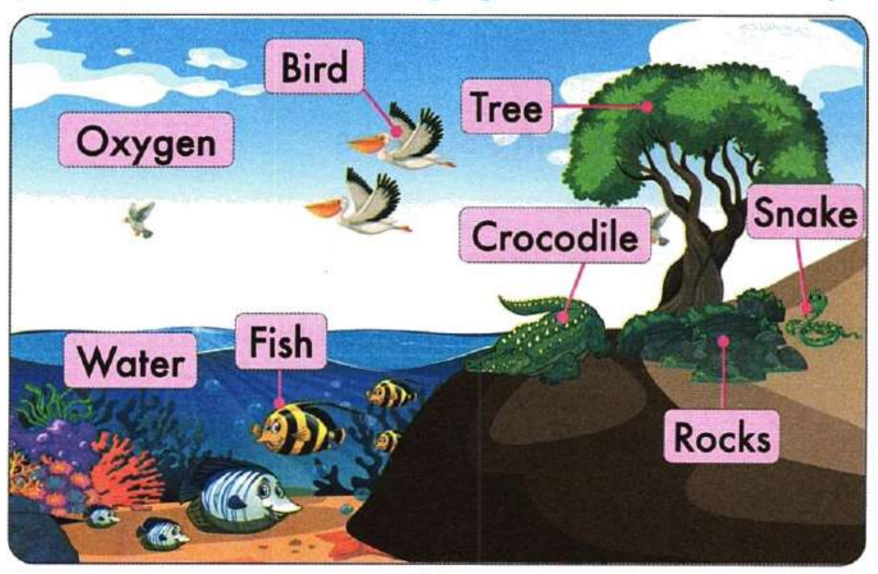
1 .... 2 .... 3 .... 4 ....

8 Study the following figures, then answer the questions below:

A Put (✓) in front of the area that shows the interaction between the Earth's spheres:

	Area "A"	Area "B"	Area "C"
1 A rabbit digs a burrow in the soil.			
2 A volcano erupts and emits carbon dioxide into the air.			
3 A bean plant releases oxygen gas during the photosynthesis process.			
4 A giraffe breathes in oxygen gas.			
5 Wind moves small broken rocks from a place to another.			

B Classify the items in the following figure into the Earth's spheres:



Biosphere	Hydrosphere	Atmosphere	Geosphere

9 Give reasons for:

1. Water is very important for plants.

....

2. Plants are renewable resources on the Earth.

....

3. Erosion by water is considered an interaction between two of the Earth's systems.

....

4. Water is a renewable resource.

....

Lesson 3



Activity 6 Earth's Systems

» To describe how different parts of the Earth work together, scientists classify objects, organisms, and phenomena into common groups or systems.

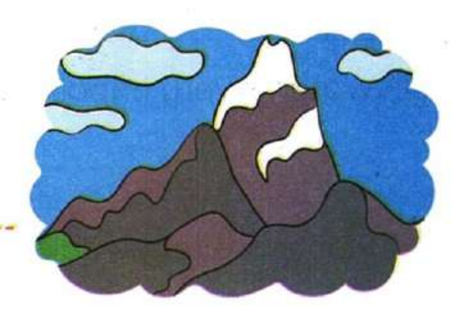
Scientists named each of the four Earth's systems using the word "sphere". → Because the shape of the Earth is very close to a sphere. (Earth is not a perfect sphere.)



Now, we are going to study the four Earth's systems.

1 Geosphere:

- It is the system that includes rocks, sand, soil, and mineral.



It contains:

- Rocks, sand and soil on the Earth.
- Molten rocks and minerals inside the Earth.
- Landforms (mountains – canyons – valley – dunes).

Note:

- Geosphere is also known as "lithosphere".

The word "geo" means "Earth".

2 Hydrosphere:

- It is the system that includes all of the water on, under, and above the Earth.



It contains:

- Oceans
- Seas
- Rivers
- Groundwater
- Glaciers

The word "hydro" means "water".

Note:

- Glaciers are large sheets of ice that are considered part of the hydorophere.

3 Atmosphere:

- It is the system that includes all the gases that surround the Earth.



It contains:

- Oxygen gas
- Carbon dioxide gas
- Water vapor
- Nitrogen gas

The word "atmos" means "vapor".

4 Biosphere:

- It is the system that includes all living organisms on the Earth.



It contains:

- Humans
- Animals
- Plants
- Birds
- Fish
- Insects
- Microorganisms

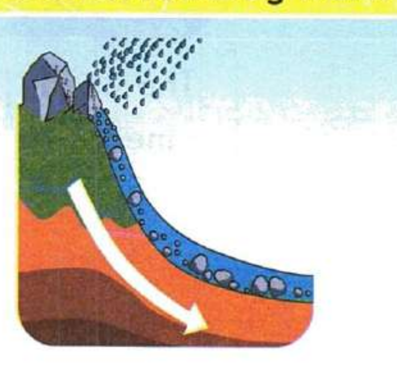
The word "bio" means "life".

Glaciers	أنهار جليدية	Seas	البحار	Oceans	المحيطات

Earth's Surface Interactions

1 Hydrosphere interacting with geosphere:

Erosion of rocks by water

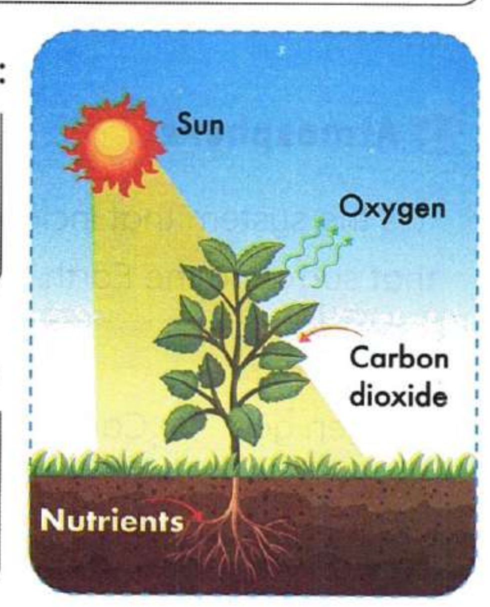


Lake formation



2 Atmosphere interacting with biosphere:

- During the photosynthesis process, plants take in carbon dioxide from the air and release oxygen gas.



3 Geosphere interacting with biosphere:

- During the photosynthesis process, the soil provides nutrients for the plant's roots.

Check your understanding?

Put (✓) or (X):

1. Earth is not a perfect sphere. ( )
2. When the fennec fox stays in a burrow, this is an interaction between the geosphere and the biosphere. ( )

Interaction	تفاعل	Photosynthesis	البناء الضوئي	Soil	تربة
Erosion	عملية التعرية	Release	ينتج	Nutrients	عناصر غذائية

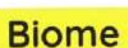


Activity  Characteristics of the Hydrosphere and Biosphere



1 Some characteristics of the biosphere:

- All living organisms belong to the biosphere.
- Living organisms are found everywhere on the Earth.

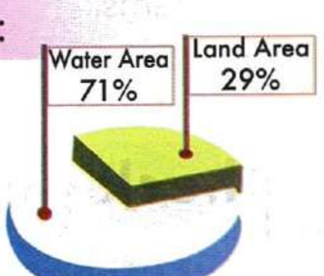


Biome

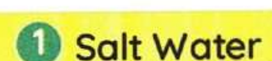
It is a large area of the world that has similar soil, climate, animals and plants (wildlife).

- Examples of biomes:
  - Deserts
  - Forests
  - Rainforests
  - Grasslands
  - Wetlands

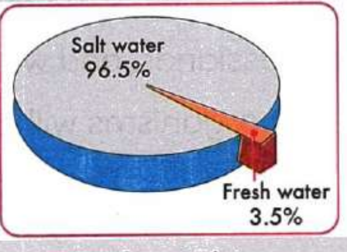
2 Some characteristics of the hydrosphere:



- The hydrosphere contains all the liquid, solid, and gaseous water of our planet.
- Nearly 71% of Earth is covered by water.



	① Salt Water	② Fresh Water
Ratio	It forms about 96.5% of water on the Earth.	It forms about 3.5% of water on the Earth.
It is found in	Oceans; Seas; Gulfs (Bays); Some lakes	Rivers; Rainwater; Groundwater; Most lakes



Note:

- Most of the fresh water on the Earth is found in glaciers, not as running water.

Interaction between the hydrosphere and biosphere

1. • Humans and animals drink water to survive.





2. • Plants need water to grow.



3. • Some animals and plants live in water.

NOTE:

• Humans are part of the biosphere that can impact all of the Earth's systems.

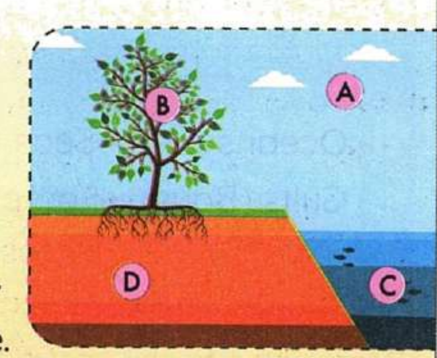
• الإنسان جزء من الغلاف الحيوي، ويمكن أن يؤثر في كل أنظمة الأرض.

Check your understanding?

» Put (✓) or (✗):

1. Most of the Earth is covered with fresh water. ( )
2. Humans can impact all of the Earth's systems. ( )
3. Deserts, rainforests, grasslands, and wetlands are biomes. ( )
4. Without water, all living organisms will not survive. ( )

» Study the following figure, then complete the sentences below:



1. Letter (..........) represents the geosphere.
2. Letter (..........) represents the biosphere.
3. Letter (..........) represents the atmosphere.
4. Letter (..........) represents the hydrosphere.

Exercises on Lesson 3

1 Choose the correct answer:

1. All of these components belong to the geosphere, except ....
   a. valleys b. minerals c. water d. mountains
2. The word "geo" means ....
   a. water b. air c. Earth d. life
3. Glaciers which are made of ice are considered part of the ....
   a. geosphere b. hydrosphere c. atmosphere d. biosphere
4. All of these are examples of the biome, except ....
   a. deserts b. wetlands c. rainforests d. minerals
5. The percentage of fresh water on the Earth is ....
   a. 96.5% b. 71% c. 3.5% d. 29%
6. All of these contain salt water, except ....
   a. seas b. gulfs c. groundwater d. oceans
7. .... process is an example of an interaction between all the Earth's systems.
   a. Photosynthesis b. Respiration c. Condensation d. Recycling
8. Most of water on the Earth is ....
   a. fresh water b. salt water c. hot water d. water vapor
9. All the following are examples of an interaction between the biosphere and the hydrosphere, except ....
   a. irrigation of plants b. a penguin living on ice
   c. lake formation d. a fish swimming in water
10. Which Earth system isn't involved during erosion of coastal rocks by sea waves and wind?
    a. Hydrosphere b. Biosphere c. Geosphere d. Atmosphere
11. When a plant get nutrients from the soil, there's an interaction between the .... and the ....
    a. biosphere - hydrosphere b. hydrosphere - geosphere
    c. hydrosphere - atmosphere d. biosphere - geosphere
12. All the following are components of the hydrosphere, except ....
    a. rivers b. groundwater c. grass d. lakes

2 Put (✓) or (✗):

1. Lake formation is an example for an interaction between the hydrosphere and the geosphere. (   )
2. Grassland is an example of a biome. (   )
3. Most bodies of water on the Earth contain fresh water. (   )
4. Most lakes have salt water, while some other lakes have fresh water. (   )
5. Without water, life on the Earth will disappear. (   )
6. Water is considered a habitat for aquatic organisms. (   )
7. Frozen water on the top of a mountain is part of the hydrosphere. (   )
8. Most of the water on Earth is drinkable. (   )
9. Oceans are considered salt bodies of water. (   )
10. The fish in the sea represent an interaction between the biosphere and the hydrosphere. (   )

3 Write the scientific term:

1. It's a large region characterized by specific climate, soil, and wildlife. (..................)
2. It's the Earth's system that includes different landforms. (..................)
3. It's the system that includes the gaseous layer surrounding the Earth. (..................)
4. It's the system that consists of all liquid, solid, and gaseous water on the Earth. (..................)
5. It's the type of water that forms about 96.5% of the Earth. (..................)
6. It's the system that includes humans, animals, and plants on Earth. (..................)

4 Complete the following using the words between the brackets:

(less – geosphere – more – biosphere – atmosphere)

1. When a frog respires, the biosphere interacts with the ....
2. The amount of fresh water is .... than that of salt water on Earth.
3. The number of lakes around the world that contain fresh water is .... than that of those containing salt water.
4. A plant's roots extending through the soil are considered an interaction between the .... and the ....

Concept 1

5 Correct the underlined words:

1. Nitrogen and oxygen gases make up most of the Earth's hydrosphere. (..........)
2. Nearly 70% of Earth is occupied by land. (..........)
3. The geosphere includes all living organisms on Earth. (..........)
4. Rivers and most of lakes contain salt water. (..........)
5. Rainwater is part of the biosphere. (..........)

6 Cross out the odd word:

1. Desert – Rivers – Glaciers – Seas (..........)
2. Rivers – Groundwater – Gulf – Rainwater (..........)
3. Deserts – Grasslands – Rainforests – Photosynthesis (..........)

7 Choose from column (A) what suits it in column (B):

A

Column (A)	Column (B)
1 Geosphere	a. is considered a habitat for marine animals.
2 Hydrosphere	b. includes all landforms on the Earth.
3 Bats hiding in caves	c. is an example of an interaction between the biosphere and the atmosphere.
4 Wind blowing through the grass	d. is an example of an interaction between the biosphere and the geosphere.

1 .... 2 .... 3 .... 4 ....

B

Column (A)	Column (B)
1 The word "geo" refers to	a. water.
2 The word "hydro" refers to	b. Earth.
3 The word "atmo" refers to	c. life.
4 The word "bio" refers to	d. vapor.

1 .... 2 .... 3 .... 4 ....

Unit 3

8 Study the following chart of salt water and fresh water distribution on Earth, then choose the correct answer:

A

B

1. Area (A) represents ....
(fresh water - salt water)
2. A sea is part of ....
(area (A) - area (B))
3. Both areas (A) and (B) belong to the .... (geosphere - hydrosphere)
4. When a polar bear hunts a seal on ice, there's an interaction between area (A) and the .... (atmosphere - biosphere)

9 Give reasons for:

1. The Earth's systems are called "spheres".
....
2. The formation of a lake is an example of an interaction between two of the Earth's spheres.
....
3. Most of the fresh water on the Earth can't be used for drinking.
....
4. Both the hydrosphere and atmosphere are important for plants to make their food.
....
5. Rainforests and deserts are considered biomes.
....

10 What happens if:

1. All bodies of water on Earth contain salt water?
....
2. The atmosphere disappears? (Concerning the plants on Earth)
....

Lesson 4

Activity  Types of Aquatic Ecosystems

» Put (✓) or (✗):

1. The hydrosphere contains fresh water and salt water. (   )
2. The amount of fresh water on Earth's surface is more than the amount of salt water. (   )

» There are many different types of aquatic ecosystems.

» In this activity, we are going to study the types of aquatic ecosystems.

Aquatic Ecosystems

1. **Saltwater Ecosystems**
   - Shallow areas
   - Deep areas
2. **Freshwater Ecosystems**
   - Still water
   - Flowing water

Shallow area	منطقة ضحلة	Still water	مياه ساكنة
Deep area	منطقة عميقة	Flowing water	مياه جارية

1 Saltwater Ecosystems

Saltwater ecosystems cover a large portion of the Earth's surface.

Shallow Areas

- These areas contain coral reefs and intertidal zones.

• Intertidal Zone

It is the area along the coast that disappears underwater at the high tide and appears at the low tide.

منطقة المد والجزر:

منطقة على طول الساحل تختفي تحت الماء عند ارتفاع المد وتظهر عند انخفاض المد.



Deep Areas

- These areas are called abyssal zones.

• Abyssal Zone

They are very deep areas in oceans where sunlight cannot reach them.

المناطق السحيقة:

هي مناطق عميقة جدًا في المحيطات بحيث لا يمكن لأشعة الشمس الوصول إليها.

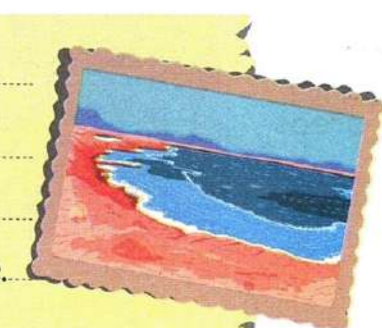


Salt Lakes:

- Lake Bardawil in Egypt
- Lake Assal in Djibouti

Lake Assal

- It has a **high concentration** of natural salts.
  - Fish (most aquatic animals) can't live in it.
  - Few plants (little vegetation) can grow there.
  - Many different types of bacteria live in it.





Concept 1

Freshwater Ecosystems

Still Water (Ponds and most lakes)

- In many ponds and lakes, fresh water is present all year.

• توجد المياه العذبة في العديد من البِرَك والبحيرات طوال العام.

Fresh Lake:
Lake Nasser in Egypt



Flowing Water (Streams and rivers)

- Streams are small bodies of flowing water.
- Many different plants and animals live in moving water.

• الجداول عبارة عن مسطحات صغيرة من المياه المتدفقة.
• تزدهر النباتات وتنمو الحيوانات المختلفة في المياه الجارية.



NOTE:

- Some ponds and lakes dry up in the hot summer months, so plants and animals that live there must adapt to this change.

• قد تجف بعض البِرَك والبحيرات في أشهر الصيف الحارة؛ لذلك تتكيَّف النباتات والحيوانات على هذه التغيرات.

Check your understanding?

Put (✓) or (✗):

1. Some plants can grow in Lake Assal because it has fresh water. (   )
2. Lake Nasser has fresh water, while Lake Bardawil has salt water. (   )

Exercises on Lesson 4

1 Choose the correct answer:

1. Coral reefs are found in ....
   a. frozen water b. abyssal areas c. fresh water d. shallow areas
2. .... are the largest bodies of water that cover most of the Earth's surface.
   a. Rivers b. Oceans c. Ponds d. Lakes
3. Lake Assal is characterized by the presence of ....
   a. low salt concentration b. bacteria
   c. many marine organisms d. fresh water
4. All the following aquatic ecosystems contain salt water, except ....
   a. Lake Nasser b. Red Sea c. Lake Assal d. Lake Bardawil
5. All the following belong to freshwater ecosystems, except ....
   a. rivers b. ponds c. streams d. seas
6. The very deep areas in oceans where there is no sunlight are called ....
   a. intertidal zones b. streams c. abyssal zones d. seashores
7. Ponds have .... water.
   a. salt b. running c. flowing d. still

2 Put (✓) or (✗):

1. Aquatic ecosystems can be classified into saltwater ecosystems and freshwater ecosystems. ( )
2. Saltwater aquatic ecosystems have a small number of living organisms. ( )
3. An ocean has a deep bright area called abyssal zone. ( )
4. Shallow areas contain coral reefs and intertidal zones. ( )
5. The salt concentration in Lake Bardawil is higher than in Lake Assal. ( )
6. There are no marine organisms that could survive in Lake Assal. ( )
7. Abyssal zones are darker than shallow areas. ( )
8. Intertidal zones appear at high tides and disappear at low tides. ( )
9. There are many aquatic organisms that survive in Lake Assal. ( )

3 Write the scientific term:

1. It's the largest water ecosystem that covers a large portion of the Earth's surface. (..........)
2. It's a zone along the coast that disappears underwater at high tide and appears at low tide. (..........)
3. They are ecosystems that may be found at the shallow areas of the oceans. (..........)
4. They are the areas that contain coral reefs and intertidal zones. (..........)

4 Complete the following using the words between the brackets:

(Freshwater – Streams – Saltwater – ponds – Intertidal zone – Lake Nasser)

1. .... ecosystems include shallow areas and deep areas.
2. .... ecosystems include ponds and most lakes.
3. .... is the area along the coast that disappears underwater at high tide.
4. Both .... and .... have still water.
5. .... have running water.

5 Correct the underlined words:

1. Shallow areas contain coral reefs and <u>abyssal</u> zones. (..........)
2. Abyssal zones are <u>shallow</u> areas. (..........)
3. Some ponds and lakes may dry up in <u>winter</u> months. (..........)
4. Lake Assal contains a few <u>fish</u>. (..........)

6 Cross out the odd word:

1. Oceans – Seas – Lake Assal – Rivers (..........)
2. Rivers – Streams – Oceans – Ponds (..........)
3. Lake Bardawil – Lake Nasser – Red Sea – Lake Assal (..........)

7 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Lake Nasser	a. contains salt water and lies in Egypt.
2 Lake Bardawil	b. contains fresh water and lies in Egypt.
3 Lake Assal	c. is a dark deep area in the oceans.
4 Abyssal zone	d. contains salt water and lies in Djibouti.

1 .... 2 .... 3 .... 4 ....

8 Study the following figure of an ocean, then put (✓) or (✗):

1. Area (A) is called the abyssal zone. ( )
2. No green plants can survive in area (B). ( )
3. Area (A) is submerged with water at low tides. ( )
4. Area (B) doesn't receive any sunlight. ( )
5. Area (A) is warmer than area (B). ( )
6. Area (B) is a shallow area. ( )

A

B

9 Give reasons for:

1. Sunlight doesn't reach the abyssal zone.

....

2. There's no fish that can live in Lake Assal.

....

3. Living organisms that live in some lakes may suffer in summer months.

....

10 What happens to:

1. Intertidal zones during high tides?

....

2. A group of fish that is placed in Lake Assal?

....





Activity 9 Aquatic Ecosystems



In this activity, we are going to study three different aquatic ecosystems and living organisms (species) that live in them.

1 Ponds

Type of water
Fresh water

Water movement
Still water

Species that live in ponds
- Water lilies
- Some worms
- Salamanders and frogs

2 Streams

Type of water

Fresh water

Water movement

Running water

(Cool and flows fast)

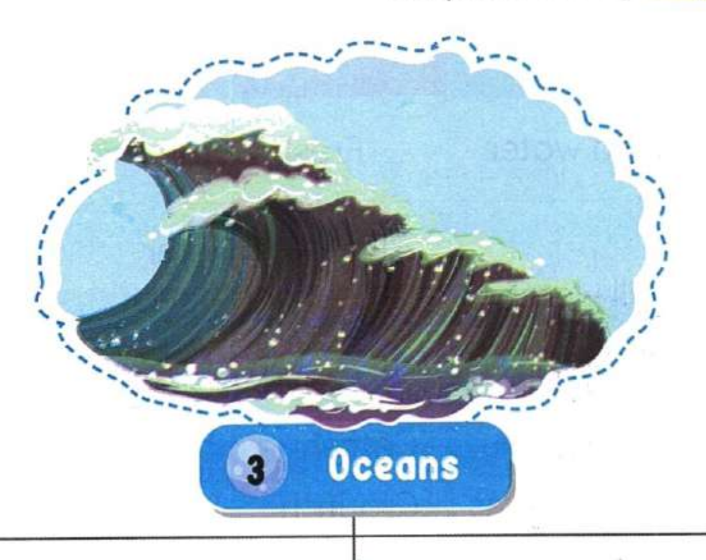
Species that live in streams

- Crayfish
- Catfish

What happens if?

Some crayfish move from a stream to a salty lake.

- They can't survive as they live in fresh water.



3 Oceans

Type of water

Salt water

Species that live in oceans

Water movement

Constantly moving in the form of waves

Kelps	Dolphins	Starfish	Moses fish (Flounder fish)
			



Whales and jellyfish live in oceans and cannot live in ponds.

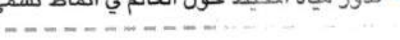
Because the ecosystems found in ponds and oceans are very different.

NOTES:

- Oceans and seas include many smaller ecosystems.
- Ocean water circulates around the world in patterns called ocean currents.

• يوجد في البيئة البحرية العديد من الأنظمة البيئية الأصغر.

• تدور مياه المحيط حول العالم في أنماط تُسمى تيارات المحيط.



P.O.C	Ponds	Streams	Oceans and Seas
Type of Water	Fresh water	Fresh water	Salt water
Water Movement	Still water	Running water (Cool and flows fast)	Constantly moving in the form of waves
Species	• Water lilies • Some worms • Salamanders • Frogs	• Catfish • Crayfish	• Kelps • Dolphins • Starfish • Flounder fish (Moses fish)

Check your understanding?

Put (✓) or (✗):

1. Crayfish can live in running salt water. (   )
2. Kelps live in oceans, while salamanders live in ponds. (   )





Activity  10 Record Evidence Like a Scientist: Water's Impact

» You have learned about how the Earth's hydrosphere and biosphere interact.

How do you describe water's impact now?



Question:

» Now describe the importance of water to living organisms.

My Claim:

» ....

....

....

Evidence:

» ....

....

....

Scientific Explanation with Reasoning:

» ....

....

....

Exercises on Lesson 5

1 Choose the correct answer:

1. Ponds contain .... and .... water.
   a. salt – still
   b. fresh – running
   c. fresh – still
   d. salt – running

2. .... are types of plants that live in ponds.
   a. Salamanders
   b. Kelps
   c. Frogs
   d. Water lilies

3. .... are plants that can be found in salt water.
   a. Water lilies
   b. Kelps
   c. Moses
   d. Grass

4. Both .... and .... live in still water.
   a. salamanders – crayfish
   b. catfish – crayfish
   c. kelps – frogs
   d. frogs – salamanders

5. All the following species live in oceans, except ....
   a. starfish
   b. kelps
   c. catfish
   d. dolphins

6. All the following species live in fresh water, except ....
   a. frogs
   b. catfish
   c. crayfish
   d. starfish

7. Crayfish can live in ....
   a. lakes
   b. oceans
   c. streams
   d. ponds

2 Put (✓) or (✗):

1. Streams have hot and slow running water. (   )
2. Both streams and ponds have fresh and still water. (   )

3. Moses can survive in streams, while dolphins can survive in oceans. (   )
4. Both crayfish and starfish live in streams. (   )
5. There are no plants that live in ponds. (   )
6. Kelps live in oceans, while salamanders live in ponds. (   )
7. The water in oceans is constantly moving in the form of waves. (   )
8. Dolphins live in salt water. (   )

3 Write the scientific term:

1. They are plants that can survive in ponds. (..................)
2. They are bodies of water that have still water. (..................)
3. It is the pattern in which the water in oceans circulates around the world. (..................)

4 Complete the following using the words between the brackets:

(flounder fish - frogs - running - worms - dolphins - still)

1. Some .... and .... can be found in ponds.
2. Water lilies grow in .... water, while catfish could survive in .... water.
3. Both .... and .... live in a large saltwater ecosystem.

5 Cross out the odd word:

1. Kelps - Catfish - Moses fish - Starfish (..................)
2. Water lilies - Salamanders - Frogs - Kelps (..................)

6 Compare between:

Point of Comparison	Salamanders	Catfish
Name of Aquatic Ecosystem	....	....

7 Study the following figures, then answer the questions below:

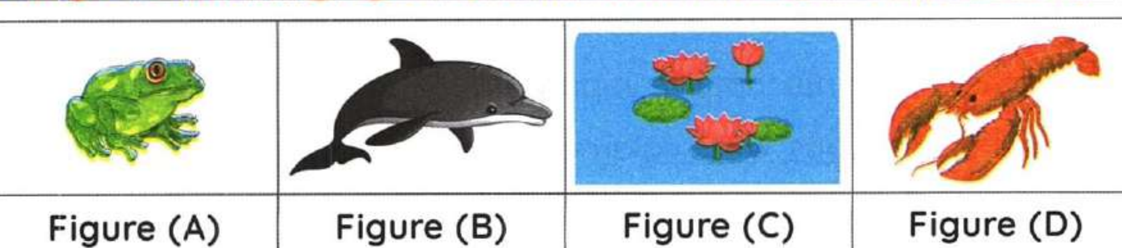


Figure (A)	Figure (B)	Figure (C)	Figure (D)

1. Which figure(s) can live in ponds?

2. Which figure(s) can live in the Pacific Ocean?

3. Which figure(s) can live in fresh water?

4. Which figure(s) can live in running water?

8 Give reasons for:

- Frogs and catfish can't live in the same habitat.

Model Exams on Concept 3.1

Model Exam 1

Question 1

(A) Choose the correct answer:

1. .... may contain fresh water or salt water.
   a. Seas b. Oceans c. Lakes d. Rivers
2. All the following are characteristics of the biosphere, except that ....
   a. it is found only on land
   b. it is found in all biomes
   c. it includes humans
   d. it contains all living organisms
3. The oxygen we breathe is a part of the Earth's ....
   a. hydrosphere b. biosphere c. atmosphere d. geosphere
4. All the following organisms can be found in oceans, except ....
   a. catfish b. starfish c. flounder fish d. dolphins

(B) Mention two uses of water.

1. .... 2. ....

Question 2

(A) Put (✓) or (✗):

1. The atmosphere contains all the solid materials on the Earth's surface.( )
2. Aquatic ecosystems can be classified into saltwater ecosystems and freshwater ecosystems. ( )
3. Both streams and ponds have fresh, still water. ( )
4. Fish in the sea represent an interaction between the biosphere and the hydrosphere. ( )

(B) Cross out the odd word: Rivers - Rainwater - Groundwater - Oceans

Question 3

(A) Choose from column (A) what suits it in column (B):

(A)	(B)
1 Abyssal zone	a. are species found in ponds.
2 Oceans	b. is a dark deep area in oceans as the Sun can't reach it.
3 Water lilies	c. is an example of the effect of water on nonliving things.
4 Weathering	d. are very large salt bodies of water.

(B) Give a reason for: Our planet looks like a blue marble from the space.

Model Exam 2

Question 1

(A) Choose the correct answer:

1. Water covers nearly .... of the Earth's surface.
   a. $\frac{1}{2}$ b. $\frac{3}{4}$ c. $\frac{1}{5}$ d. $\frac{1}{4}$
2. Lake Assal is characterized by the presence of ....
   a. low-salt concentration b. bacteria c. many fish d. fresh water
3. In the water cycle, there's an interaction between the ...... and the ...... on Earth.
   a. biosphere - hydrosphere b. hydrosphere - geosphere
   c. hydrosphere - atmosphere d. atmosphere - geosphere
4. Catfish can survive in .... water environment.
   a. salt and still b. fresh and fast
   c. salt and current d. fresh and still

(B) What happens if:

Some crayfish are transferred to a salty lake?

Question 2

(A) Write the scientific term:

1. It's an area along the coast that disappears at high tide and appears at low tide.
2. It's a plant that can survive on still fresh water habitats.
3. It's one of the Earth's systems that includes the gases surrounding the Earth.
4. It's the water stored in the cracks and spaces between underground rocks.

(B) Cross out the odd word: Rivers - Oceans - Seas - Lake Assal

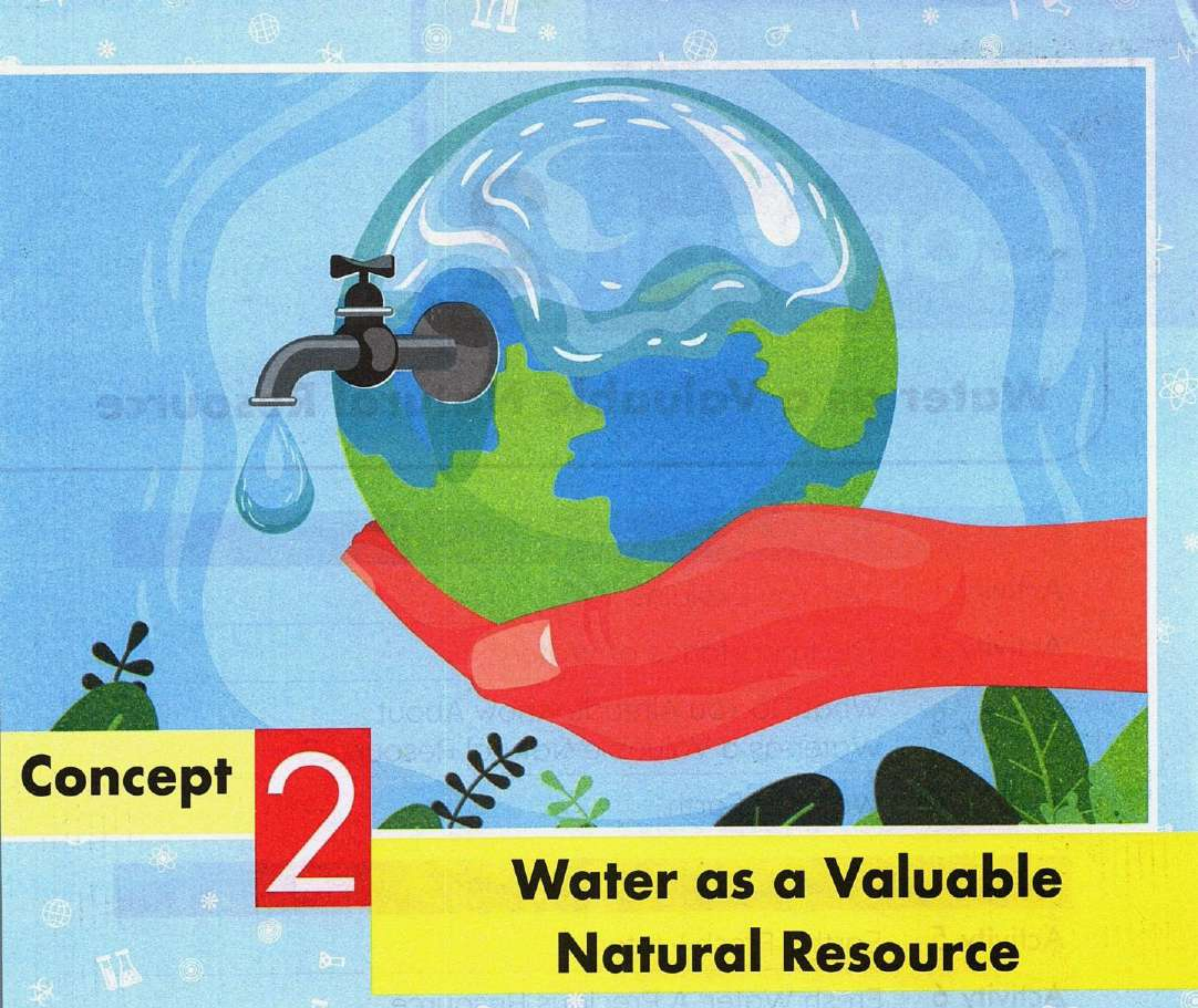
Question 3

(A) Complete the following sentences using the given words:

(biosphere – oceans – larger – erosion – geosphere)

1. The amount of groundwater on the Earth is .... than the water in rivers and lakes.
2. The process of transportation of weathered rocks from a place to another is known as ....
3. Kelps, starfish and Moses fish live in .... that are considered the largest salt bodies of water on Earth.
4. A plant's roots extending through soil are considered an interaction between the .... and the ....

(B) Give a reason for: Plants are renewable resources on Earth.



Concept 2

Water as a Valuable Natural Resource

Concept Objectives:

By the end of this concept, students will be able to:

- Describe the patterns of water distribution on Earth.
- Analyze a map and predict outcomes of events in a watershed.
- Identify threats to freshwater resources and offer suggested solutions.
- Identify the problem related to over-consumption of natural resources.
- Describe how human activities affect water and other natural resources.
- Compare several solutions for the conservation and sustainable use of the Earth's natural resources.
- Discuss with evidence how human can change his behavior to protect natural resources and the environment.

Key Vocabulary:

- Wetland
- Natural resource
- Watershed
- Scarcity
- Conservation
- Pollution
- Sustainability
- Preservation
- Wastewater
- Water filter
- Estuary
- Tributaries

Concept 2

Water as a Valuable Natural Resource





There are many natural resources on Earth, such as:

Water	Plants	Metals (Gold, silver, aluminum)
		



1. Water is a valuable natural resource.
   Because all living organisms need water to survive.
2. The amount of fresh water is limited on Earth.
   Because most of the water on Earth is salt water, which cannot be processed by most organisms.





We must conserve fresh water and prevent its pollution, where polluted water can harm plants and animals.

• يجب علينا الحفاظ على كمية الماء وحمايته من التلوث؛ حيث إن الماء المُلوَّث قد يضر النباتات والحيوانات.




Activity 2 The Importance of Water

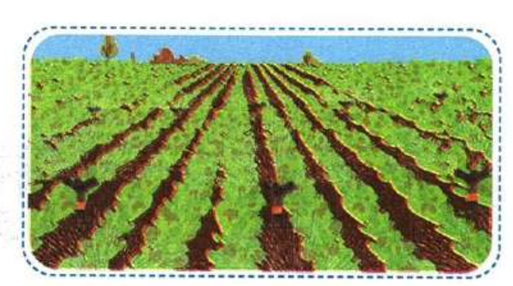
» You have learned that humans rely on water in many different ways, such as drinking, cleaning and manufacturing ...etc.

Uses of Water

In Egypt, water is used in:



Generating electricity
(at Aswan High Dam)



Agriculture

Around the world, many people work on the water by:



Fishing



Transporting goods

Sources of Water

» There are many sources of water on Earth, such as:

- Oceans
- Seas
- Lakes
- Ponds
- Rivers
- Streams
- Rain
- Glaciers
- Groundwater

Check your understanding?

» ***Put (✓) or (✗):***

1. Not all water sources on Earth are drinkable. ( )
2. Understanding how to use and conserve water is important for all people. ( )



Activity 3 What Do You Already Know About Water as a Valuable Natural Resource?

» Classify the sources of water into "fresh" or "salt" water:

Groundwater - Rain - Seas - Oceans - Rivers - Ponds - Streams - Glaciers

Fresh Water	Salt Water



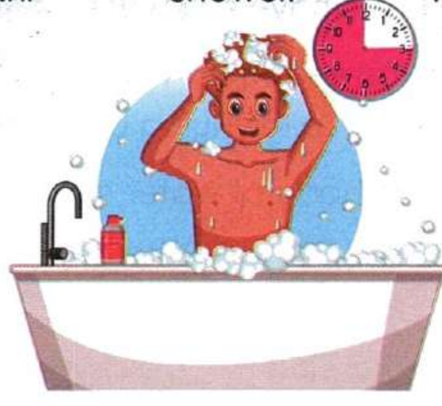


Conserving Fresh Water

» We can conserve fresh water in many different ways, such as:

1. Turning off the faucet while brushing your teeth.
2. Taking a quick shower.
3. Turning off the water while washing your hair.







Check your understanding?

» *Put (✓) or (✗):*

1. Conserving fresh water means using it in a correct way. ( )
2. The amount of fresh water is limited on Earth. ( )



Activity 4 Water of Earth

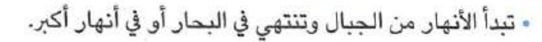
Unit 3

» In this activity, we will study some bodies of water in details.

Bodies of Water

1 A river:

Type of Water:	Fresh water
Location:	• A river often starts in: the mountains as a stream. • A river ends when it meets: a sea, or a larger river.



• تبدأ الأنهار من الجبال وتنتهي في البحار أو في أنهار أكبر.



2 A lake:

Type of Water:	• Most lakes have fresh water. • Some lakes have salt water.
Location:	A lake is formed when water is collected in a low-lying area.
Description:	It is a large body of water surrounded by land.

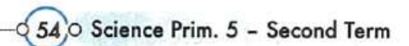
• مسطحات مائية كبيرة محاطة باليابسة من جميع الجهات. • تتشكَّل مياه البحيرة عندما تتجمَّع المياه في منطقة منخفضة.

3 A wetland:

Type of Water:	Fresh water
Location:	An above-ground land area partially covered with water.
Types:	1 Swamps (Marshes) 2 Ponds (bogs)



• مناطق يكون فيها منسوب الماء أعلى قليلًا من مستوى سطح الأرض.





4 An estuary:

Type of Water:	A mixture of fresh water and salt water.
Location:	Where a river meets the ocean or sea

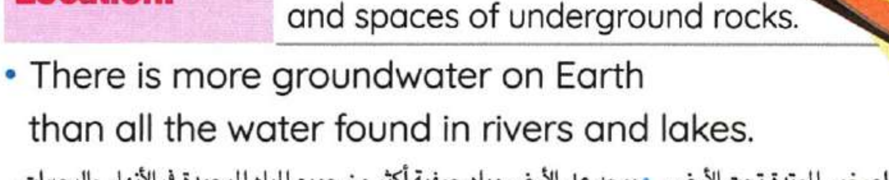
- An estuary is home to thousands of plants and animals.

• هو مكان التقاء النهر بالمحيط أو البحر. • تُعد مصبات الأنهار موطنًا لآلاف النباتات والحيوانات.

5 Groundwater:



Type of Water:	Fresh water
Location:	It is the water stored in the cracks and spaces of underground rocks.



- There is more groundwater on Earth than all the water found in rivers and lakes.

• المياه الموجودة داخل شقوق ومسام الصخور الممتدة تحت الأرض. • يوجد على الأرض مياه جوفية أكثر من جميع المياه الموجودة في الأنهار والبحيرات.

6 An ocean:

Type of Water:	Salt water
Location:	Large bodies of water that surround the continents.

- All oceans are connected to each other.
- The ocean's floor has mountains, plains, and plateaus.

• تحيط المحيطات بالقارات. • تتصل مياه المحيطات بعضها ببعض. • يضم قاع المحيط جبالًا وسهولًا ووديانًا.



Check your understanding?

» Complete using the given words:

(Rivers - Lakes - Estuaries - oceans)

1. .... contain fresh water or salt water.
2. .... contain fresh water only, while .... contain salt water only.
3. .... contain a mixture of salt water and fresh water.

Exercises on Lesson 1

1 Choose the correct answer:

1. The basic liquid which is needed by humans and plants is ....
   a. milk b. water c. oil d. alcohol
2. We can drink water from all the following sources, except ....
   a. rivers b. streams c. seas d. groundwater
3. .... and .... are considered sources of fresh water.
   a. Seas – rivers b. Seas – oceans
   c. Ponds – seas d. Streams – rivers
4. We can conserve fresh water by ....
   a. keeping the faucet open on brushing our teeth
   b. decreasing the shower time
   c. taking a long shower
   d. drinking salt water
5. Water can be used in all the following purposes, except ....
   a. generating electricity b. transportation
   c. cultivation d. burning wood
6. .... are formed when water is collected in low-lying areas.
   a. Estuaries b. Oceans c. Lakes d. Rivers
7. .... is formed when the water of a river meets the water of a sea.
   a. An estuary b. A lake c. An ocean d. A wetland
8. The amount of salt water on Earth is .... the amount of fresh water.
   a. larger than b. smaller than c. equal to d. half
9. .... is a land partially covered with water.
   a. An ocean b. A wetland c. An estuary d. A lake
10. .... is a body of water that may contain fresh water or salt water.
    a. A river b. A wetland
    c. A lake d. An estuary

11. All the following are found in the ocean floor, except ....
a. plateaus b. rivers c. mountains d. plains

12. .... include both swamps and ponds.
a. Seas b. Rivers c. Sand dunes d. Wetlands

2 Put (✓) or (✗):

1. Water isn't considered a natural resource. ( )
2. Groundwater is an example of a fresh water resource. ( )
3. The percentage of fresh water on Earth is higher than that of salt water. ( )
4. Most lakes contain salt water. ( )
5. Turning on the faucet while brushing your teeth conserves fresh water. ( )
6. Oceans are considered salt bodies of water. ( )
7. A river often starts in a mountain and ends in a sea or a larger river. ( )
8. A lake is a large body of water surrounded by land. ( )
9. Plants can grow in estuaries. ( )
10. All oceans on Earth are connected together. ( )
11. An ocean's floor may have mountains, plains, and plateaus. ( )
12. Swamps may contain fresh water or salt water. ( )

3 Write the scientific term:

1. It's a body of water which is formed when water is collected in a low-lying land. (............)
2. It's the water stored in the cracks and spaces of underground rocks. (............)
3. It's a land which is partially covered with water. (............)
4. It's a body of water that is surrounded by land. (............)
5. It's a body of water that has a mixture of salt water and fresh water. (............)
6. They are large bodies of water that surround continents. (............)

Unit 3

4 Complete the following using the words between the brackets:

(more than – silver – electricity – lakes – an ecosystem – fresh water)

1. We must take a quick shower to conserve ....
2. Most .... contain fresh water.
3. In Aswan High Dam, water is used to generate ....
4. The metals, such as .... and gold, are from the natural resources on Earth.
5. The amount of groundwater on the Earth is .... the water in rivers and lakes.
6. An estuary is .... to thousands of plants and animals.

5 Correct the underlined words:

1. Marshes and ponds are types of lakes. (............)
2. The river's floor has mountains, plains, and plateaus. (............)
3. There's a lake at the end of the Nile River, where it meets the Mediterranean Sea. (............)
4. The African continent is surrounded by rivers. (............)

6 Cross out the odd word:

1. Glaciers – Seas – Streams – Rivers (............)
2. Rivers – Rain – Groundwater – Oceans (............)

7 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Oceans	a. are located where a river meets a sea.
2 Estuaries	b. often start in mountains.
3 Rivers	c. are lands partially covered with water.
4 Swamps	d. surround the continents.

1 .... 2 .... 3 .... 4 ....

8 Classify the water resources in the following table:

Red Sea - Atlantic Ocean - Nile River - Amazon River

Fresh Water	Salt Water
....	....
....	....
....	....

9 Study the following figure, then complete:

a. The water in area (..........) is a mixture of salt water and fresh water..

b. The water in area (..........) is salt water.

c. The water in area (..........) is fresh water.

10 Give reasons for:

1. We should turn off the water while brushing our teeth.

....

2. We should conserve fresh water.

....

3. Most of the water the exists in the Earth's hydrosphere is not suitable for drinking.

....

4. An estuary contains a mixture of salt water and fresh water.

....

11 What happens if:

1. Water is collected in a low-lying area?

....

2. The water of a river meets the water of a sea?

....



Lesson 2



Activity 5 Earth's Fresh Water

- Fresh water is very important for drinking, irrigation, agriculture, industry, and generating electricity.
- About 10% of the world's animal species live only in freshwater habitats.

• يعيش أكثر من 10 % من فصائل الحيوانات المختلفة في العالم في مواطن المياه العذبة فقط.



Risks that threaten fresh water:

1 Scarcity of resources:

• Water has become limited (scarce) in many parts of the world which threatens the life of living beings.

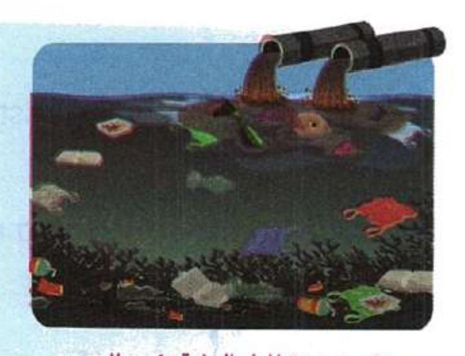
• أصبحت المياه محدودة في معظم أنحاء العالم؛ مما يهدد حياة الكائنات الحية.



2 Poor quality of fresh water:

• Poor quality of fresh water leads to:

1. The death of thousands of organisms each year.
2. The extinction of many living organisms, such as fish and amphibians.



• نقص جودة المياه العذبة يؤدي إلى:

1 موت الآلاف من الكائنات الحية كل عام.

2 انقراض العديد من الكائنات الحية، مثل: الأسماك والبرمائيات.

Check your understanding?

Put (✓) or (✗):

1. We have to protect our freshwater environments. ( )
2. Fresh water occupies 10% of the Earth. ( )



Activity 6 Fresh Water: A Precious Resource



- Much of the study of water focused on **fresh water** because of its vital importance.
- Many people in the world still do not have access to fresh water because of **drought**.

• تتركز معظم الدراسات المائية على المياه العذبة؛ لتأثيرها الحيوي والمهم.

• لا يزال العديد من البشر حول العالم لا يستطيعون الوصول إلى المياه العذبة؛ بسبب الجفاف .



- **Fresh water is a precious resource for living organisms.**
Because humans and animals can only drink fresh water, and plants need it to survive.







- One of the strategies that humans use to control and conserve fresh water for different purposes is building dams.

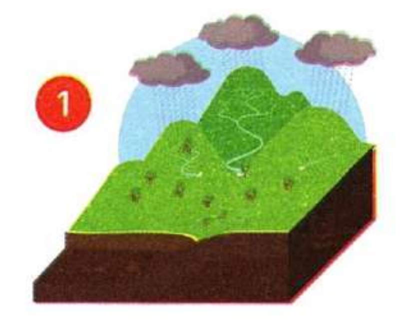
Dam

It is a structure built across the river to **store**, **control** and **conserve** water.

هو حاجز يتم بناؤه عبر النهر لتخزين وللتحكم والحفاظ على المياه.

Imagine it's raining! Where does all the water go?

- After raining, the land and bodies of water work together to collect water in a common location that is called a **watershed**.

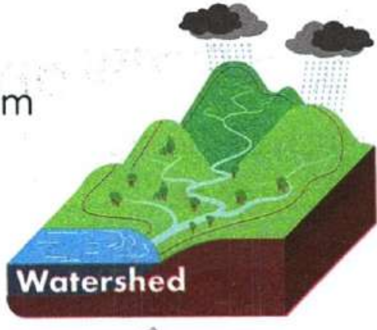






Unit 3

Watershed



- It is an area of land where all the water from different sources flows (drains) in one direction towards a common location.

• مستجمعات المياه: منطقة منخفضة الارتفاع تتجمَّع فيها المياه من مصادر مختلفة.

The Effect of Rain on a Body of Water

If	Then
There is more rainfall than a river or a stream can handle.	The water level will rise causing flooding.
There is too little rainfall on a river or a stream.	The water level will drop causing drought.



1 إذا كان هناك هطول للأمطار أكثر مما يمكن للنهر أن يحتويه؛ سيؤدي ذلك إلى ارتفاع منسوب المياه وحدوث الفيضانات.

2 إذا كان مقدار سقوط الأمطار قليلا جدًا؛ سيؤدي ذلك إلى انخفاض منسوب المياه وحدوث الجفاف.

NOTES:

- If there is a water balance, rivers will have a constant source of fresh water.
- If there is a water imbalance, drought or flooding may happen.

• إذا كان هناك توازن مائي؛ سيكون للأنهار مصدر ثابت للمياه العذبة. • إذا كان هناك خلل في توازن المياه؛ فقد يحدث جفاف أو فيضانات.

Check your understanding?

Put (✓) or (X):

1. If there is too little rainfall, the level of water will increase. ( )
2. Water balance may lead to drought or flooding. ( )

Exercises on Lesson 2

1 Choose the correct answer:

1. .... of fresh water may cause the extinction of some amphibians.
   a. Conservation b. Poor quality c. Enough quantity d. High quality
2. When there's more rainfall, the water level in a river .... causing ....
   a. decreases – drought b. increases – drought
   c. decreases – flooding d. increases – flooding
3. When a stream receives too little rainfall, ... may occur to this stream.
   a. drought b. flooding c. pollution d. overflowing
4. Too little rainfall on a river may cause all the following, except ....
   a. decrease of water level b. dropping of water level
   c. flooding d. drought
5. The area of land where the water from different sources flows towards a common location is called a/an ....
   a. estuary b. watershed c. lake d. gulf

2 Put (✓) or (✗):

1. Conservation and poor quality are concerns that threaten fresh water on Earth. ( )
2. About 10% of the world's animal species live in salt water. ( )
3. Finding and preserving fresh water will be one of the major challenges of this century. ( )
4. Plants need fresh water to survive and grow. ( )
5. Extinction of frogs may happen because of the limited amount of salt water on Earth. ( )
6. Resources of fresh water on Earth are unlimited. ( )
7. Humans build dams across rivers to save water. ( )
8. When the rate of rainfall on a river decreases, the river may dry up. ( )

3 Write the scientific term:

1. It is an area of land where all the water that flows across it flows downhill to a common location and in one direction. (..................)
2. It's a structure built on a river to control and conserve water. (..................)

4 Complete the following using the words between the brackets:

(poor quality - dams - floods - death - scarcity)

1. The poor quality of water leads to the extinction of some organisms or causes the .... of others.
2. When a stream receives more rainfall, it leads to ....
3. Humans control and conserve water by building ....
4. Among the risks that threaten fresh water on Earth are .... and ....

5 Correct the underlined words:

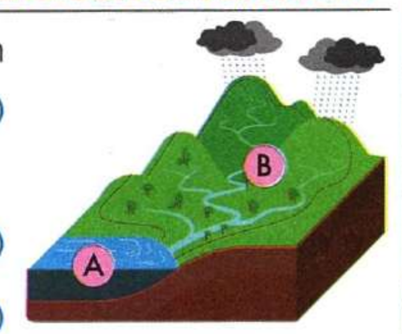
1. Availability of resources of fresh water threatens many living organisms' lives. (..................)
2. We use salt water in industry, irrigation, and generating electricity. (..................)

6 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 A watershed	a. causes the drought of a river.
2 Too little rainfall	b. is an area of land where all the water that flows across it drains downhill to a common location and in one direction.
3 If the level of rainfall increases,	c. must be conserved because it is limited on Earth.
4 Fresh water	d. the river may flood.

1 .... 2 .... 3 .... 4 ....

7 Study the following figure, then choose the correct answer:



1. The following figure represents the formation of .... (a watershed - a mountain)
2. Water flows from .... to ....
   (area "A" → area "B" - area "B" → area "A")
3. Area "A" could be .... (a lake - a swamp)

8 Give reasons for:

1. The poor quality of fresh water affects the living organisms that live in it.

   ....
2. Some fish and amphibians that live in freshwater habitats go extinct.

   ....
3. Many people in the world still do not have access to fresh water.

   ....
4. Humans build dams on rivers.

   ....
5. The increase in rainfall rate on a river causes flooding.

   ....

9 What happens if:

1. The quality of water in a pond gets poor?

   ....
2. The rate of rainfall on a river increases?

   ....
3. The level of water in a stream keeps decreasing?

   ....

Lesson 3

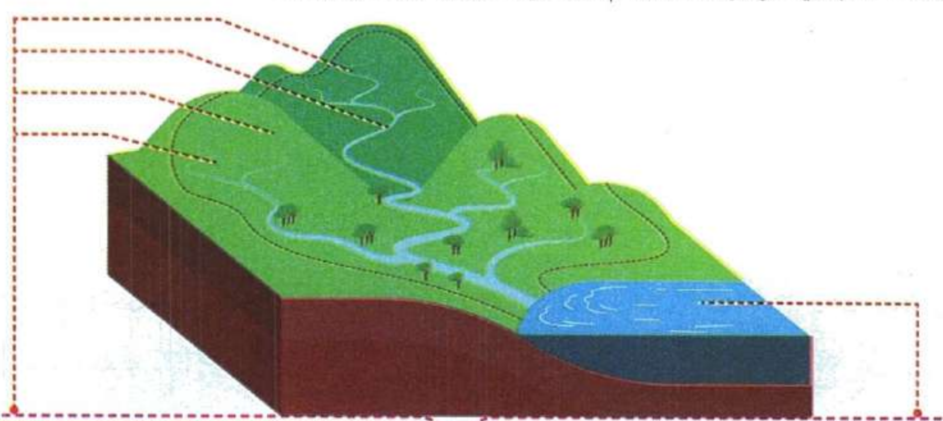


Activity 7 Watershed Predictions

- Watersheds can help scientists understand how bodies of water interact with each other.
- Some human bad activities may affect river tributaries and then affect people, animals, and plants near these tributaries.

• يمكن لمستجمعات المياه أن تساعد العلماء على فهم كيفية تفاعل المسطحات المائية مع بعضها البعض.

• قد تؤثر بعض الأنشطة البشرية على روافد الأنهار، ثم تؤثر على الناس والحيوانات والنباتات.



Tributaries:
They are small bodies of water, such as small creeks or streams, that flow into a larger rivers.

الروافد:
مسطحات مائية صغيرة مثل الجداول الصغيرة التي تتدفق إلى نهر أكبر.

Watershed:
It is an area of land where all the water from different sources flows towards a common location.

مستجمع المياه:
منطقة منخفضة الارتفاع تتجمع فيها المياه من مصادر مختلفة.

Tributaries (Small creeks or streams) → Flow in → **Big rivers** → Flow in → **Larger bodies of water** (Bays, seas or oceans)

NOTES:
- Rivers start upstream and end downstream.
- What happens upstream will affect the bodies of water downstream, as all bodies of water are connected together.

Watershed Map



Use the information in the Watershed Map to predict which other bodies of water would be affected when...?

Scenario 1:

A factory is built near letter A.

- Water in tributary A will carry waste to tributaries B and C.

Scenario 2:

A dam is built at letter F.

- The dam will hold water behind it.
- Water levels rise in tributaries C, D and E.
- Water level drops in tributary J.

Scenario 3:

A farm near letter D has a herd of cows or uses chemical fertilizers.

- The waste of the farm will be carried to tributaries E and F.

Scenario 4:

A trash dump has been established near letter I.

- On windy days, litter will be blown into the water at tributary I, and then litter will be carried to tributaries J and K.

Check your understanding?

» Put (✓) or (✗):

1. The blue color in the watershed map represents bodies of water. (   )
2. What happens downstream will affect the bodies of water upstream. (   )

Exercises on Lesson 3

1 Choose the correct answer:

1. Small .... and .... are examples of river tributaries.
   a. bays - creeks b. creeks - oceans
   c. seas - streams d. streams - creeks
2. The water of a small creek flows into ....
   a. an ocean b. a bigger river c. a smaller stream d. a sea
3. What's the correct sequence of water flow through the following bodies of water?
   a. A stream → an ocean → a bigger river
   b. A big river → a stream → a sea
   c. A creek → a bigger river → an ocean
   d. An ocean → a river → a creek
4. The small bodies of water that flow into a bigger river are called ....
   a. estuaries b. tributaries c. watersheds d. bays
5. .... is a place where the river starts.
   a. An estuary b. An upstream c. An ocean d. A downstream
6. All the following cause water pollution, except for the existence of .... on a river.
   a. a dam b. a factory c. a farm d. a trash dump
7. The water of a big river flows into large bodies of water, such as .... and ....
   a. a creek - a bay b. a bay - an ocean
   c. a sea - a creek d. a stream - an ocean

2 Put (✓) or (✗):

1. Water can flow from a bigger river to a tributary. ( )
2. What happens in tributaries affects what happens in upstream bodies of water. ( )
3. On building a dam on a river, the water level of the river will not change. ( )
4. Watershed maps help scientists understand how bodies of water interact with each other. ( )
5. The water of a small stream flows directly into an ocean. ( )
6. Tributaries are large bodies of water that flow into a bigger river. ( )

3 Write the scientific term:

1. They are small creeks or steams flowing into a bigger river. (..........)
2. They are maps used to know the direction of the flow of water. (..........)

4 Complete the following using the words between the brackets:

(downstream - dam - factory - upstream - wind - tributary)

1. What happens .... will affect .... bodies of water.
2. Litter of a trash dump near a .... is blown by .... to the other bodies of water connected to it.
3. Building a .... near a tributary affects the water quality downstream, while building a .... affects the water amount downstream.

5 Study the following figure, then put (✓) or (✗)::

1. The body of water in area "A" could be a creek. ( )
2. The body of water in area "D" could be a sea. ( )
3. On building a factory in area "C", the body of water in area "D" will be polluted. ( )
4. The body of water in area "B" could be an ocean. ( )
5. On establishing a dam on the body of water in area "A", the amount of water in area "E" will change. ( )

6 Give reasons for:

1. What happens upstream in river tributaries affects downstream bodies of water.

....

2. The existence of a farm near a river tributary has a bad impact on the downstream river.

....

7 What happens if:

1. A factory is built near a stream that flows into a big river?

....

2. A dam is built on a river that flows towards a sea?

....

3. A trash dump is found near a tributary that is connected to a river?

....

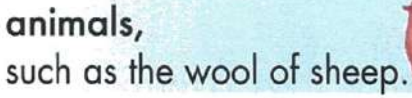
Lesson 4



Activity  8 Conservation, Preservation, and Sustainability

» Many of the products that we use every day are made from natural resources, such as:



Products		Natural Resources
 Paper	 is made from →	trees. 
 Plastic	 is made from →	oil products. 
 Clothes	are made from →	plants, such as cotton.  animals, such as the wool of sheep. 

Humans can conserve natural resources by:



1. Preservation of resources
الحفاظ على الموارد



2. Sustainability
الاستدامة

1 Preservation of resources

- It means restricting access to or use of natural resources.
- هو الحد من الوصول للموارد الطبيعية أو استخدامها.

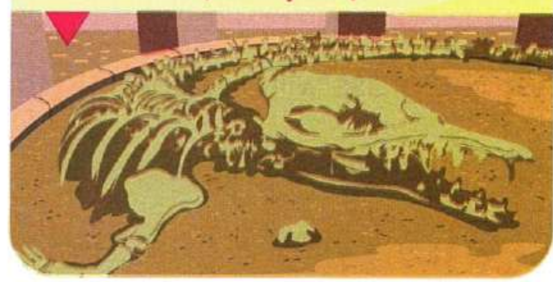
Examples of Resources Preservation

- Establishing protected areas of land to prevent overusing the natural resources in them, where resources cannot be harvested (drained), such as:

1 Ras Mohammed Protectorate
(In South Sinia)



2 Wadi Al-Hitan Protectorate
(In Fayom)



- تخصيص مناطق محمية بغرض حماية الموارد من الاستنزاف، مثل: محمية رأس محمد فى جنوب سيناء، ومحمية وادي الحيتان بالفيوم.

Examples of Harvesting (Depleting) Resources

Overfishing



If the consumption of fish by humans increases more than fish reproduction,

that causes:

1. Fish in oceans to become scarce.
2. Fishing opportunities to decrease.

Overusing groundwater



If the groundwater is used more than it is compensated for (replaced) by rain,

that causes:

1. The water in the well to run out.
2. The wells to dry up.

2 Sustainability

- It means using natural resources in a way that does not negatively affect the future supply of these resources.
- هو استخدام الموارد الطبيعية بطريقة لا تؤثر سلبًا على تلك الموارد مستقبلًا.

Unsustainable situation: Cows are placed in many small areas of grass.

1. Cows begin to eat all the grass before the new grass grows back.
2. The grass will disappear in these areas.



3. Cows will starve.

- إذا وضعت الأبقار في العديد من المناطق الصغيرة من العشب، تبدأ الأبقار في أكل كل العشب قبل أن ينمو العشب الجديد، وسوف يختفي العشب؛ مما يتسبب في تعرُّض الأبقار للجوع الشديد.

Sustainable situation: Cows are placed in one large area of grass.



1. The grass will grow back in other areas.
2. Cows will still have more food.

- إذا وُضعت الأبقار فى مساحة كافية، سيظل لدى الأبقار الكثير من الغذاء؛ حيث سينمو العشب مرة أخرى.

The resources sustainability is affected by:

Overpopulation	Pollution	Overusing of resources	Unequal distribution of resources
الكثافة السكانية	التلوث	الإفراط في استهلاك الموارد	التوزيع غير المتكافئ للموارد

Renewable doesn't mean unlimited.

القابلية للتجدُّد لا يعني بالضرورة الاستدامة

When fresh water is polluted:

(Renewable resource)



- The water becomes undrinkable.



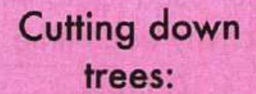
Burning coal and oil:

(Nonrenewable resource)



- Leads to soil pollution.
- Leads to the death of animals and plants.



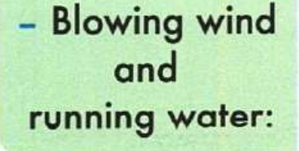


(Renewable resource)



- Leads to deforestation.
- Leads to soil erosion.





(Renewable resource)



- Lead to soil erosion.



- تلوث المياه العذبة: تسبِّب التلوث في جعل الكثير من مياه الأرض غير صالحة للشرب.
- حرق الموارد غير المتجددة: يتسبب حرق الفحم أو البترول في تلوث التربة وموت النباتات والحيوانات.
- قطع الأشجار: يتسبب إزالة وقطع الكثير من الأشجار في تدمير الغابات.
- هبوب الرياح والمياه المتدفقة: يمكن أن يؤديا إلى نقل التربة من خلال التعرية.

Check your understanding?

» Put (✓) or (✗):

1. We must be careful not to overuse or damage our resources. (   )
2. Some factors that affect sustainability are overpopulation and pollution. (   )




Unit 3

Activity 9 How Much Water Do You Use?

- We use water every day for many different activities, such as:

Washing our hand | Brushing our teeth | Taking a shower | Flushing the toilet

- This activity will help you find out the amount of water that you use every day.

The table below explains how to calculate the average amount of water used by one person.

Activity that requires water	Time taken to do this activity (Min)		Amount of water used each minute (Liter)		Total amount of water used to do this activity each time
Taking a shower	5	x	2	=	10 liters

If a person repeats this activity two times in one day:

10 x 2 = 20 liters

Amount of water used to do this activity each time | Number of times you repeat this activity in one day | Total amount of water used to do this activity in one day

How to conserve water during daily activities



1. Turn off the water when brushing your teeth.
2. Decrease your shower time.



Exercises on Lesson 4

1 Choose the correct answer:

1. Plastic spoons are made from products of ....
   a. oil b. tress c. animals d. paper
2. .... and .... can be made from plants.
   a. Paper – plastic bags b. T-shirts – books
   c. Plastic bags – books d. Paper – plastic cups
3. .... and .... are ways of conserving natural resources.
   a. Overusing – sustainability b. Preservation – overpopulation
   c. Sustainability – preservation d. Preservation – deforestation
4. When humans rationalize natural resources to keep them available in the future, this is called ....
   a. preservation b. overpopulation
   c. over-consumption d. sustainability
5. .... Protectorate is a protected area in South Sinai.
   a. Wadi Al-Hitan b. Bluestone
   c. Ras Mohammed d. Yellowstone
6. .... of natural resources means restricting access to or using these resources.
   a. Restoration b. Pollution c. Preservation d. Sustainability
7. Deforestation occurs due to ....
   a. pollution b. cutting down trees
   c. using fossil fuel d. sustainability
8. All the following are sustainable situations, except ....
   a. using fossil fuel wisely b. rationalizing usage of water
   c. putting a herd of sheep in one large grassy area
   d. putting a herd of sheep in many small grassy areas
9. All the following are renewable resources, except ....
   a. plants b. animals c. coal d. water

10. All the following are factors that affect resources' sustainability, except for ....
   a. pollution
   b. overpopulation
   c. damage of resources
   d. equal distribution of resources
11. If you use 30 liters of water to take a 10-minute shower, you will use .... of water to decrease the time of your shower.
   a. 30 liters
   b. 60 liters
   c. 50 liters
   d. 25 liters

2 Put (✓) or (✗):

1. Clothes can be made from cotton or the wool of sheep. (   )
2. Wadi Al-Hitan Protectorate is located in Fayoum. (   )
3. Sustainability is an important way of resources depletion. (   )
4. Renewable resources are always sustainable. (   )
5. Cutting down many trees in a forest is a sustainable situation. (   )
6. Unequal distribution of resources leads to the unsustainability of resources. (   )
7. If we place cows in many small areas of grass, the grass will disappear. (   )
8. If we don't use renewable resources wisely, they will be used up. (   )
9. Recycling paper leads to renewable resource sustainability. (   )
10. Burning fossil fuel causes soil pollution that causes survival of plants and animals. (   )
11. You can conserve water by leaving the water running when brushing your teeth. (   )

3 Write the scientific term:

1. It is a strategy of control that involves reaching for natural resources and using them. (..........)
2. It is using resources in a way that does not negatively affect the future supply of these resources. (..........)
3. It is a human activity that leads to deforestation. (..........)
4. It is a human activity that leads to decreasing the number of fish in oceans. (..........)

4 Complete the following using the words between the brackets:

(undrinkable – soil erosion – preservation – dry up – decreasing – deforestation)

1. Restricting access to resources in Ras Mohammed protectorate is an example for ....
2. Cutting down trees leads to .... and ....
3. Overfishing leads to .... the number of fish.
4. When fresh water is polluted, it becomes ....
5. If people in Siwa overuse the groundwater, the wells may ....

5 Correct the underlined words:

1. Paper is made from <u>oil products</u>. (..................)
2. Restricting access to resources is called <u>sustainability</u> of resources. (..................)
3. Establishing protectorates is an example of <u>sustainability</u> of natural resources. (..................)
4. Deforestation causes soil <u>pollution</u> by water and wind. (..................)
5. You should <u>increase</u> the time spent taking a shower. (..................)

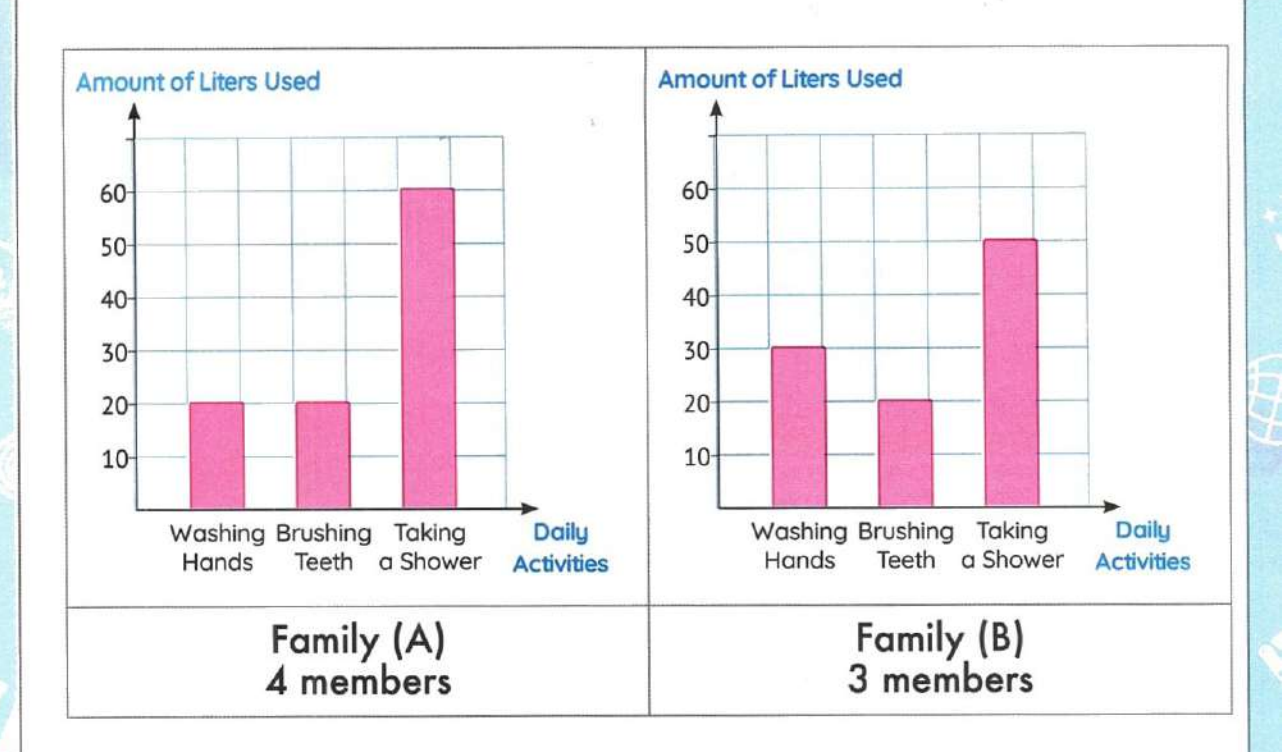
6 Choose from column (A) what suits it in column (B):

Column (A) Activity	Column (B) Leads to
1 Cutting trees	a. Water becomes undrinkable.
2 Overusing groundwater	b. Fish become rare.
3 Overfishing	c. Soil pollution.
4 Water pollution	d. The wells become dry.
5 Burning coal and oil	e. Trees become rare.

1 .... 2 .... 3 .... 4 .... 5 ....

7 Study the following two graphs that illustrate the amount of water used daily by two families, then choose the correct answer:

(Note: All members in each family use equal amounts of water.)



1. Family (A) and family (B) use the same amount of water in ....
   a. washing their hands b. brushing their teeth c. taking a shower

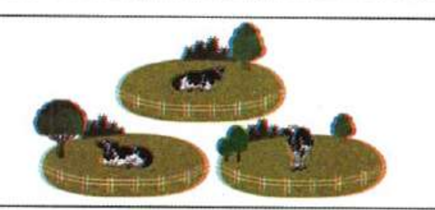
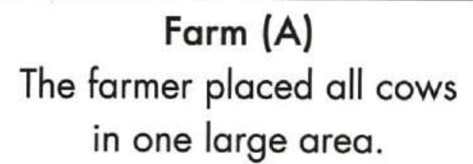
2. The total amount of water used by family (A) is .... the amount used by family (B).
   a. more than b. less than c. equal to

3. Family (A) uses more amount of water than family (B) in ....
   a. washing their hands b. brushing their teeth c. taking a shower

4. Family (A) uses less amount of water than family (B) in ....
   a. washing their hands b. brushing their teeth c. taking a shower

5. The amount of water used by each member in family (A) is .... the amount used by each member in family (B).
   a. more than b. less than c. equal to

8 Study the following figures, then complete:

	
 **Farm (A)** The farmer placed all cows in one large area.	**Farm (B)** The farmer placed all cows in many small areas.

1. Farm (..........) is an example for a sustainable situation.
2. In farm (..........), cows may be hungry after a short time.
3. In farm (..........), there is plenty of food.

9 Give reasons for:

1. Egypt has established the Ras Mohammed Protectorate.

   ....

2. Over-consumption of fossil fuel has a bad effect on soil, plants, and animals.

   ....

3. People must stop cutting down trees.

   ....

4. Overfishing has a bad impact on the marine community.

   ....

10 What happens if:

1. Trees are cut down at a fast rate to get wood?

   ....

2. Large amounts of fossil fuel are burned, such as coal and oil?

   ....

3. Cows are placed in many small areas of grass?

   ....

4. Fresh water is polluted?

   ....

Lesson 5



Activity 10 Drinking Water

Put (✓) or (✗):

1. Although water is a renewable resource, we must not waste it. (   )
2. If we add mud to water, the water becomes undrinkable. (   )

- Fresh water is a limited natural renewable resource.
- Humans create many methods to filter and recycle polluted water.

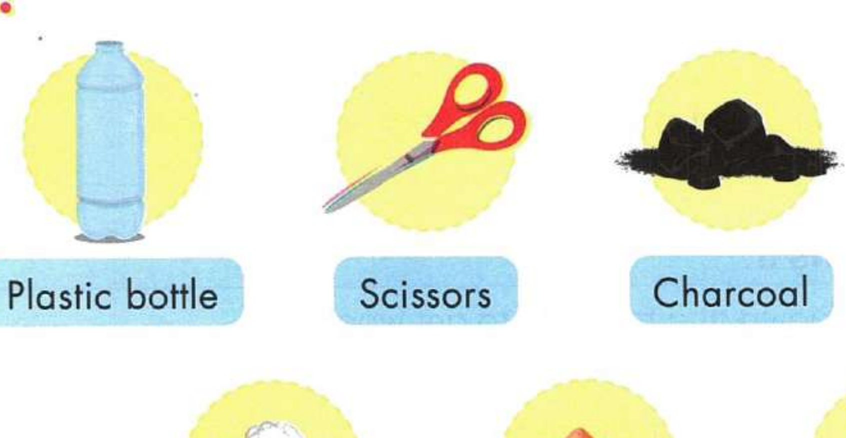
Recycling water

It is the process of removing harmful materials from water.



Experiment: Making a Model of Water Filter

Tools:





Cotton balls



Sand

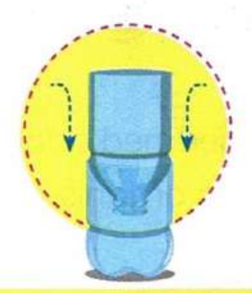


Dirty water
(Mud + clear water)

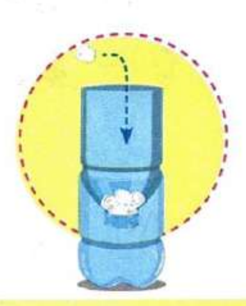
Steps:



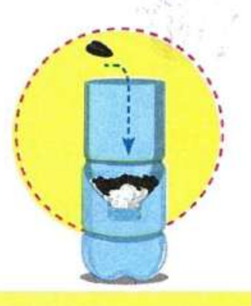
1. Cut off the bottom of the plastic bottle.



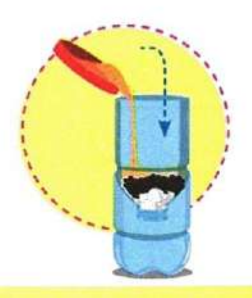
2. Place it upside down on the bottle.



3. Put the cotton ball in the cut bottle.



4. Put the charcoal above the cotton balls.



5. Put the sand above the charcoal.



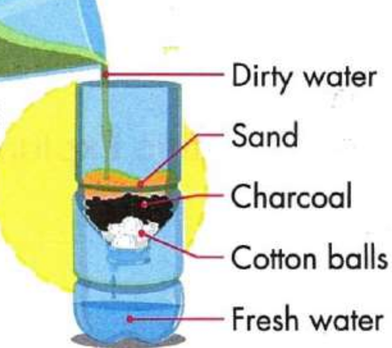
6. Pour the dirty water in the filter.

Observation:

- The filter removes most of the dirt from the dirty water.

Conclusion:

- The filter model helps us remove harmful materials from the polluted water.







Activity 11 Record Evidence Like a Scientist: The Importance of Water

Unit 3

» You have learned about water as a valuable source and its importance for all living organisms that live on Earth.









Question:

» How can you describe the importance of water now?

My Claim:

» ....

....

Evidence:

» ....

....



Scientific Explanation with Reasoning:

» ....

....





STEM in Action



Activity 12 Wastewater Engineers

» We must conserve fresh water during our daily activities by changing our habits.

Recycling Water

» Solar energy drives the water cycle in nature.

» Humans can recycle wastewater and reuse it in many purposes.

- تعد الطاقة الشمسية هي المحرك الأساسي لدورة الماء في الطبيعة.
- يساهم الإنسان في حركة المياه على الأرض عندما يستخدم المياه ويعيد تدويرها.



The Water Cycle

Wastewater engineers

- They are special kinds of scientists that work in water treatment plants, such as Bahr Al-Baqar wastewater treatment plant in Egypt.

- يعمل مهندسو معالجة مياه الصرف الصحي في محطات معالجة المياه مثل محطة بحر البقر في مصر.

Wastewater is the water that has already been used in homes and different industries.

- مياه الصرف الصحي:

هي المياه التي تم استخدامها في المنازل أو المصانع.



The role of wastewater engineers in recycling wastewater:

Their role before recycling wastewater:

1. They decide where to build water treatment facilities.
2. They design tools to provide us with clean water.
3. They check the water quality and the amount of pollutants in the water.

• دور مهندسي معالجة مياه الصرف الصحي قبل عملية معالجة المياه:
– مسئولون عن تحديد أماكن إنشاء مرافق معالجة المياه.
– يقومون بتصميم أدوات تساعدنا للحصول على مياه نظيفة.
– التحقق من جودة المياه وكمية الملوثات في الماء.

Their role during recycling wastewater:

1. They observe and check each step in the process.
2. They test the treated water to make sure it is safe to use.

• دور مهندسي معالجة مياه الصرف الصحي أثناء عملية معالجة المياه:
– يراقبون ويتحققون من كل خطوة من خطوات عملية معالجة المياه.
– اختبار المياه التي تمت معالجتها قبل أن يستخدمها الإنسان؛ للتأكد من كونها آمنة وصالحة للاستخدام.

Their role in protecting community:

1. They design ways to protect a community from floods.
2. They calculate the amount of drinking water that the community needs.

• دور مهندسي معالجة مياه الصرف الصحي في حماية المجتمع:
– تصميم طرق لحماية المجتمعات من الفيضانات.
– حساب كمية المياه التي يحتاجها المجتمع.

Check your understanding?

Put (✓) or (✗):

1. Biologists are scientists that work in water treatment plants. (   )
2. Wastewater is the water that has already been used in homes. (   )

Exercises on Lesson 5

1 Choose the correct answer:

1. .... are used to remove harmful materials from polluted water.
   a. Dams　　b. Turbines
   c. Water filters　　d. Magnets

2. .... isn't an item used to make a model of a water filter.
   a. Cotton　　b. Sand
   c. Charcoal　　d. Oil

3. All of these can be removed by a simple water filter, except for ....
   a. mud　　b. rock pieces
   c. salt　　d. dirt

4. When water is ...., it means removing waste materials from it.
   a. conserved　　b. recycled
   c. drained　　d. polluted

5. In a water filter, ... is the first item through which waste water passes.
   a. sand　　b. charcoal
   c. cotton　　d. paper

6. Humans can .... waste water to recycle it and use it again.
   a. filter　　b. boil
   c. freeze　　d. conserve

7. .... are stations that recycle waste water.
   a. Power plants　　b. Gas stations
   c. Water treatment plants　　d. Waterfalls

8. .... are scientists that observe the water quality.
   a. Hydrologists　　b. Wastewater engineers
   c. Doctors　　d. Biologists

Unit 3

2 Put (✓) or (✗):

1. Fresh water is a limited nonrenewable natural resource. ( )
2. Clear water gets polluted on adding mud to it. ( )
3. You can make a simple water filter by using sand only. ( )
4. Water filters are used to remove useful materials from wastewater. ( )
5. Humans can't recycle wastewater to reuse it. ( )
6. The water cycle is an example of recycling water. ( )
7. Wastewater engineers design tools to pollute water. ( )
8. Wastewater engineers can monitor the water quality by checking the water contaminants. ( )

3 Write the scientific term:

1. It is the process of removing harmful materials from water by filtration. (..........)
2. It is a device that is used to remove harmful materials from wastewater. (..........)
3. It is the water that has already been used in homes. (..........)
4. They are the scientists that work at water treatment plants. (..........)

4 Complete the following using the words between the brackets:

(wastewater engineers - floods - polluted - rivers - test - water filter)

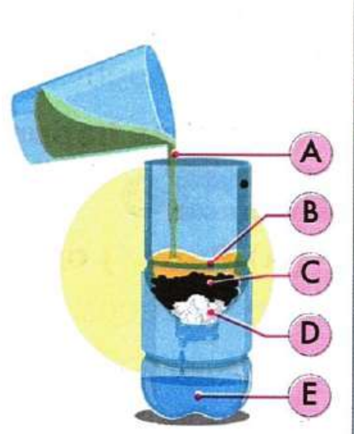
1. If you add mud to clear water, it becomes ....
2. A .... removes harmful materials from wastewater.
3. The scientists that work at wastewater treatment plants are called ....
4. After the water treatment process occurs, wastewater engineers .... it before releasing it into ....
5. Wastewater engineers design ways to protect communities from ....

5 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Solar energy	a. is the water that has been used before in homes and industries.
2 Wastewater	b. observe the water quality during water treatment.
3 Bahr Al-Baqar	c. plays an important role in the water cycle.
4 Wastewater engineers	d. is a wastewater treatment plant in Egypt.

1 .... 2 .... 3 .... 4 ....

6 Study the following figure, then answer the questions below:



1. What is the name of the opposite model?

....

2. Label the figure:

A. .... B. ....

C. .... D. ....

E. ....

3. What is the importance of this model?

....

4. What is the name of this process?

....

7 Give reasons for:

1. Humans create many methods to filter water.

....

2. Wastewater engineers test the treated water.

....

8 What happens if:

- You add some sand and mud to pure water?

....

Model Exams on Concept 3.2

Model Exam 1

Question 1

(A) Choose the correct answer:

1. All of these can be removed by a simple water filter, except for ....
   a. mud b. rock pieces c. salt d. dirt
2. .... and .... can be made from plants.
   a. Paper - plastic bags b. T-shirts - books
   c. Plastic bags - books d. Paper - plastic cups
3. .... of resources requires managing their usage methods.
   a. Depletion b. Sustainability c. Renewability d. Scarcity
4. When a stream receives too little rainfall, ... may occur to this stream.
   a. drought b. flooding c. pollution d. overflowing

(B) What happens if: The quality of water in a pond gets poor?

Question 2

(A) Put (✓) or (✗):

1. All oceans on Earth are connected together. ( )
2. Building dams on rivers may cause water pollution. ( )
3. Tributaries are large bodies of water that flow into a bigger river. ( )
4. If we don't use renewable resources wisely, they will be used up. ( )

(B) Give a reason for:

We should turn off water when brushing our teeth.

Question 3

(A) Write the scientific term:

1. It is a way of using resources in a way that does not negatively affect the future supply of that resource. (........)
2. It is a land which is partially covered with water. (........)
3. They are the scientists that work at water treatment plants. (........)
4. They are small creeks or streams flowing into a bigger river. (........)

(B) Correct the underlined word:

The <u>river's</u> floor has mountains, plains, and plateaus. (........)

Model Exam 2

Question 1

(A) Choose the correct answer:

1. .... and .... are considered sources of fresh water.
   a. Seas - rivers b. Seas - oceans
   c. Ponds - seas d. Streams - rivers
2. The area of land where water of rivers and streams flows towards a common location is called a/an ....
   a. wetland b. watershed c. lake d. estuary
3. .... is formed when the water of a river meets the water of a sea.
   a. An estuary b. A lake c. An ocean d. A wetland
4. Water can be used in all the following purposes, except ....
   a. generating electricity b. transportation
   c. cultivation d. burning wood

(B) Correct the underlined word:

Fresh water is a limited <u>nonrenewable</u> natural resource. (..........)

Question 2

(A) Put (✓) or (✗):

1. Turning on the water faucet while brushing your teeth conserves fresh water. ( )
2. The ocean's floor may have mountains, plains, and plateaus. ( )
3. It is forbidden to hunt fish in the Ras Mohammed Protectorate. ( )
4. Clothes can be made from cotton or the wool of sheep. ( )

(B) What happens if:

A factory is built near a stream that flows into a big river?

Question 3

(A) Complete the following sentences using the given words:

(sustainability - water filter - dams - deforestation)

1. Humans control and conserve water by building ....
2. Cutting down trees leads to ....
3. A .... removes harmful materials from wastewater.
4. When humans rationalize natural resources to keep them available in the future, this is called ....

(B) Give a reason for:

Over-consumption of fossil fuel has a bad effect on soil, plants and animals.

School Book

Assess Your Learning on Unit 3

Choose the correct answer:

1. The fresh water that flows under the Earth's surface through a layer of porous rock is ....
   a. Mediterranean Sea water
   b. Bahr Al Baqar Water Plant
   c. Assal Lake
   d. groundwater

2. .... are parts of the geosphere.
   a. Plants
   b. Gases
   c. Rocks
   d. Bodies of water

3. An area of land where water flows in a specific path from a high-altitude area to a lower-altitude area is a/an ....
   a. river
   b. sea
   c. lake
   d. ocean

4. .... results from the interaction between the hydrosphere and the atmosphere.
   a. Availability of oxygen gas
   b. Increased pollution
   c. Soil fertility
   d. Photosynthesis

5. An example of a saltwater ecosystem is ....
   a. the Nile River
   b. Assal Lake
   c. a glacier
   d. Nasser Lake

6. Most of fresh water on Earth is found in the form of ....
   a. groundwater
   b. rivers
   c. glacier rivers
   d. streams

7. A group of plants and animals which live together in a large area characterized by its climate is called the ....
   a. atmosphere
   b. hydrosphere
   c. biome
   d. geosphere

8 Weathering of rocks by water indicates an interaction between ....

a. the hydrosphere and the geosphere

b. the biosphere and the hydrosphere

c. the biosphere and the atmosphere

d. the atmosphere and the hydrosphere

9 The water that covers most of the Earth's surface is the ....

a. fresh water in rivers

b. salt water in seas and oceans

c. fresh water in glaciers

d. fresh water in groundwater

10 The protectorate is one example of ....

a. sustainability of natural resources

b. depletion of natural resources

c. the quality of natural resources

d. preservation of natural resources

11 Sea and ocean water meet with river water at ....

a. watersheds

b. surface canals

c. estuaries

d. streams

12 .... of resources requires managing their usage methods.

a. Depletion

b. Renewability

c. Sustainability

d. Scarcity

13 Pollution of sea water leads to ....

a. pollution of water of a tributary

b. pollution of oceans water

c. pollution of water streams

d. wetlands pollution

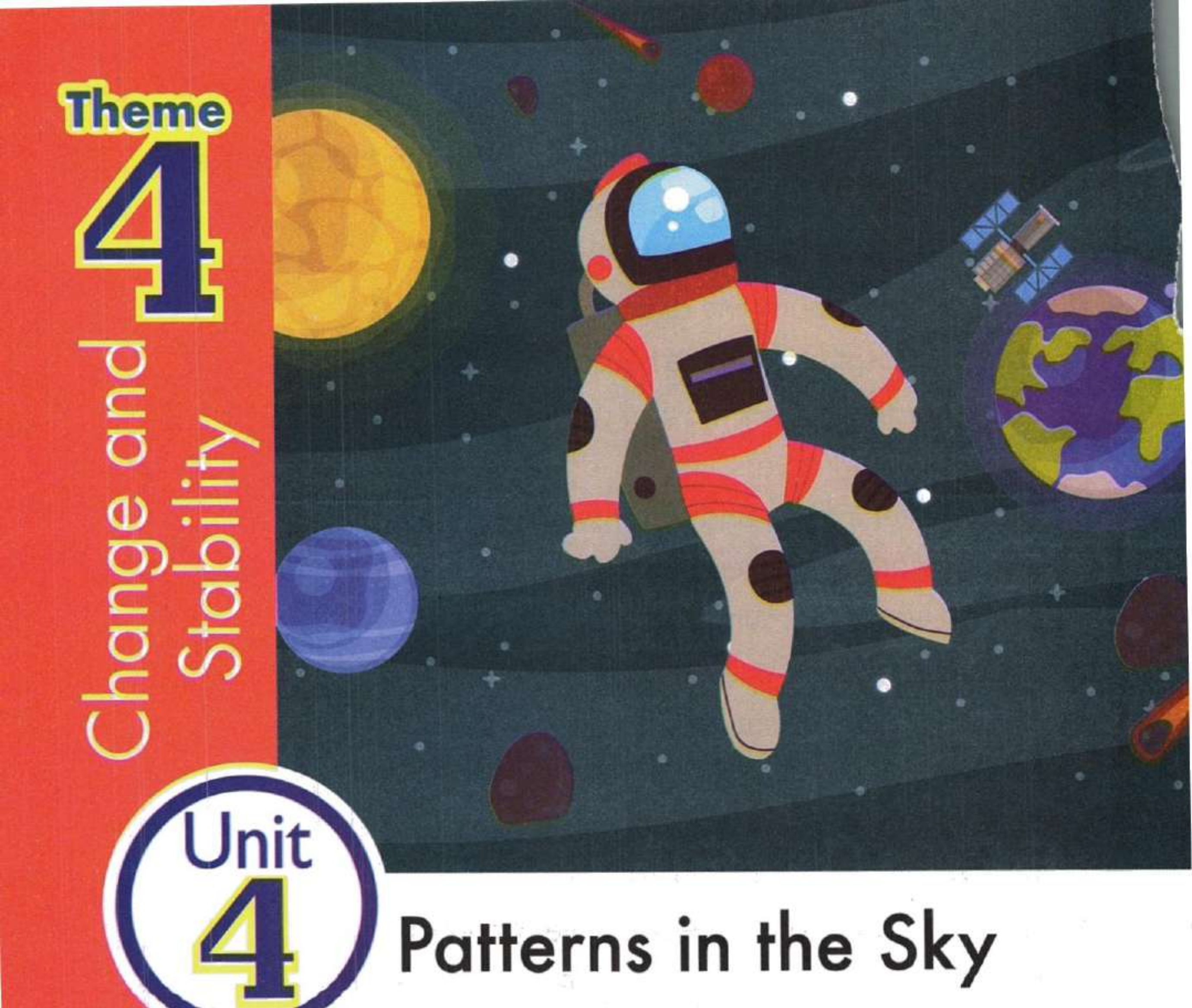
14 Wastewater engineers work in Egypt in ....

a. Wadi El Hitan Reserve

b. Bahr El Baqar Plant

c. Qarun Lake

d. electrical power plants



Theme 4

Change and Stability

Unit 4 Patterns in the Sky

Unit Concepts:

Concept 1 Effects of Gravity

Concept 2 Patterns of Motion in the Sky

Unit Project Sundial

Get Started
What I Already Know

When you look at the sky during the day,

- you will observe that the sun rises from the east and sets from the west.
- you can observe the change in the length and location of shadows of objects.

• أثناء نظرك للسماء خلال النهار، فإنك ستلاحظ أن الشمس تشرق من الشرق وتغرب من الغرب، كما ستلاحظ تغيُّر طول الظل ومكانه.





When you look at the sky during the night,

- you will observe that the stars appear to move in the sky.
- you will observe the change in the shape of the moon during the month.

• أثناء نظرك للسماء خلال الليل، فإنك ستلاحظ أن النجوم تتحرَّك في السماء، كما ستلاحظ تغيُّر شكل القمر خلال الشهر.

Shadow Formation

- A shadow is formed when light falls on an opaque object. The shape of the shadow changes during the day and during the months.
- The direction of sunlight that falls on the object controls the length and location of the shadow.



• يتكوَّن الظل عندما يسقط الضوء على جسم معتم، وتتغير أشكال الظلال خلال اليوم وخلال الأشهر.
• يتحكم اتجاه ضوء الشمس الذي يسقط على الجسم في طول الظل ومكانه.

Project

Sundial

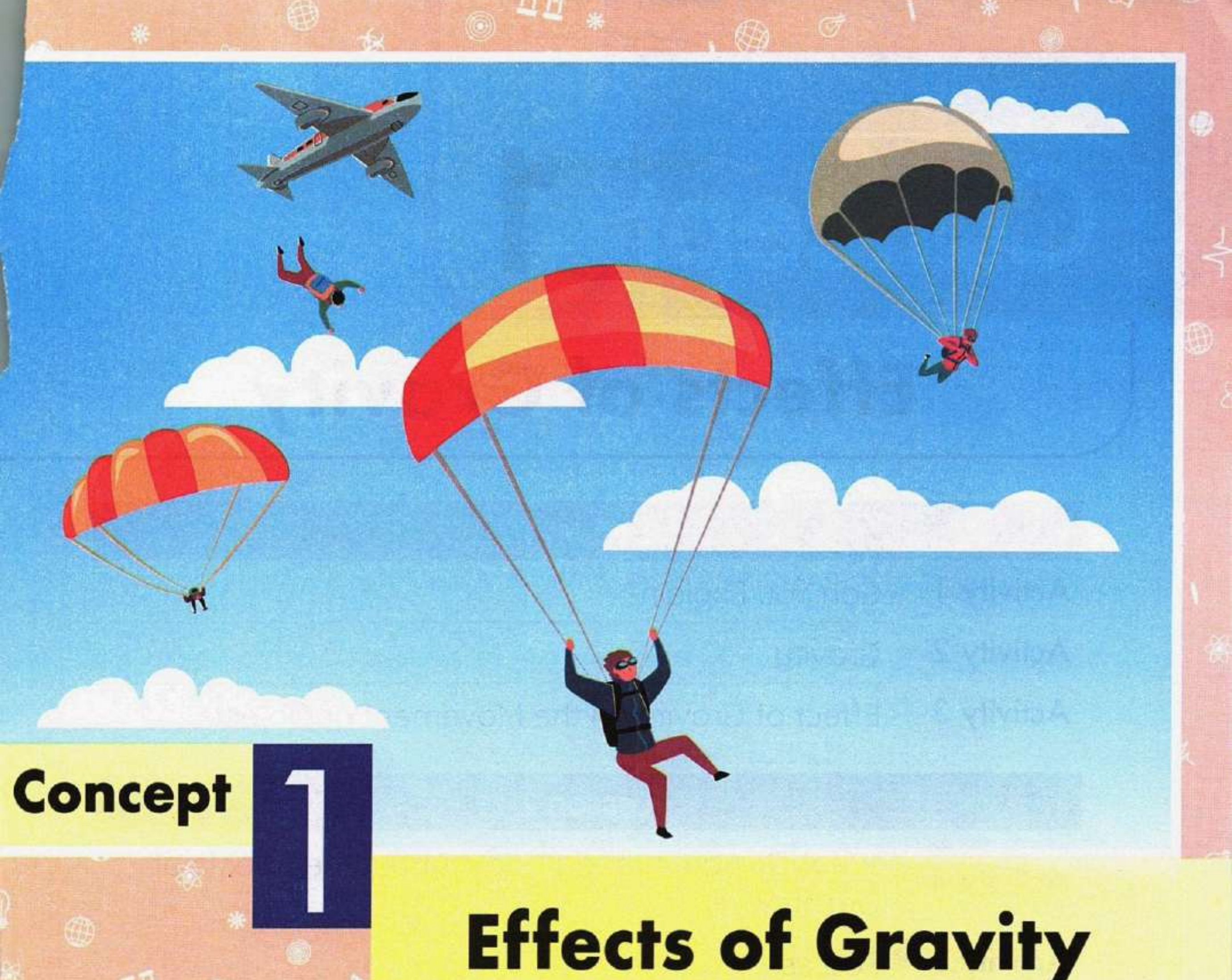
A device that detects time by tracking the movement of the Sun across the sky and how it affects the formation of the shadow of objects.

الساعة الشمسية: هي جهاز يُستخدم لمعرفة الوقت عن طريق تتبُّع حركة الشمس، ويُستخدم الظل في حساب الوقت.



In this unit, you are going to study:

- The patterns of motion in the sky.
- The difference in the night sky over time of the year.
- The effect of gravity on the movement of objects.
- The movement of Earth in space and how this movement changes seasons.
- The changes in the shape of the moon along the month.
- The Sun and star brightness.



Concept 1

Effects of Gravity

Concept Objectives:

By the end of this concept, students will be able to:

- Describe patterns in objects experiencing gravitational force on small scales, and large scales.
- Argue from evidence that the gravitational force Earth exerts on objects is directed downward, toward the center of Earth.
- Plan and conduct an investigation to produce data to show evidence of the effects of gravity and air resistance on different objects.

Key Vocabulary:

- Air resistance
- Gravity
- Magnetism
- Motion
- Orbit
- Ellipse
- Force
- Friction

Concept 1

Effects of Gravity

Lesson 1	
Activity 1	Can You Explain?
Activity 2	Gravity
Activity 3	Effect of Gravity on the Movement of Objects

Lesson 2	
Activity 4	What Do You Already Know About the Effects of Gravity?
Activity 5	Forces

Lesson 3	
Activity 6	What Is Gravity?
Activity 7	The Force of Gravity
Activity 8	What Does Down Mean?

Lesson 4	
Activity 9	Pull and Graviy Around Us
Activity 10	Gravity and the Motion

Lesson 5	
Activity 11	The Revolving Planets
Activity 12	Record Evidence Like a Scientist: Gravity



Lesson 1



Activity 1 Can You Explain?

» Look at the image of skydiver in the air, the force that causes the skydiver to fall down to the ground is called ....

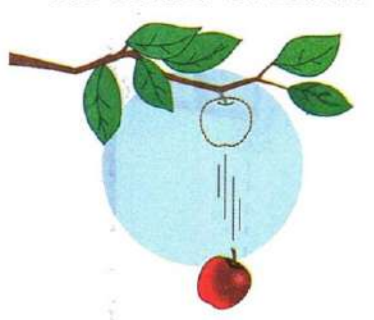
(magnetism - friction - gravity)



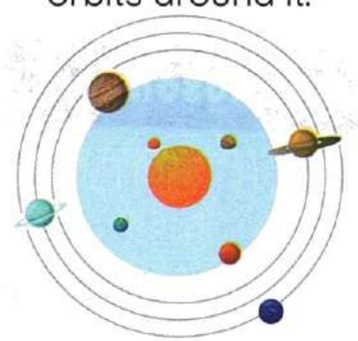
How does gravity affect the movement of objects ?



The gravity of the Earth pulls objects with mass down toward the center of Earth.

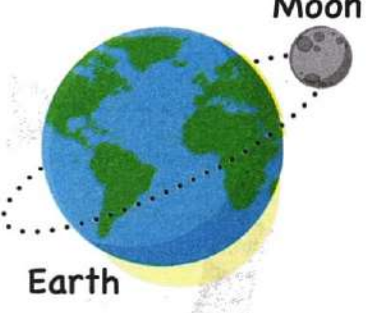


The gravity of the Sun keeps the planets revolve in fixed orbits around it.



The gravity of the moon affects the ocean tides.





• كيف تؤثر الجاذبية في حركة الأجســـام؟

– قوة الجاذبية الأرضية تسحب الأجسام التي لها كتلة في اتجاه مركز الأرض.

– تتسبب قوة جاذبية الشمس في حركة الكواكب في مدارات ثابتة حول الشمس.

– تؤثر قوة جاذبية القمر على المد والجزر في المحيط.

Gravity

It is the force of attraction between objects that have mass.



Unit 4

Activity 2 Gravity

» **How does gravity cause the motion of objects?**

Look at the images; think what they have in common?



A boy on bike falling down.



Pouring oil

» The two images are similar in that something is going down toward the ground.

» Gravity pulls the boy and the oil down toward the ground and causes their motion.

• كلتا الصورتين تعبر عن السقوط من أعلى إلى أسفل. • قوة الجاذبية جذبت الولد والزيت لأسفل نحو الأرض مما أدى لحركتهما.



Give a reason for...

In basketball game, each time the ball is thrown in the air, it falls toward the ground.

Due to gravity that pulls the ball down toward the ground.

Check your understanding?

» ***Put (✓) or (✗):***

1. If we throw an apple up in the air, it will fall to the ground again due to the gravity. ( )
2. We can't see the force of gravity but we feel its effect. ( )



Activity  3 Effect of Gravity on the Movement of Objects

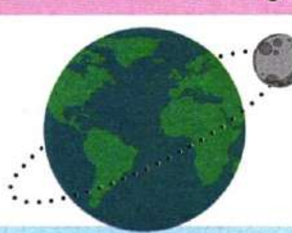
- Gravity is the force of attraction between objects.
- Gravity pulls all objects with mass to the Earth's center.

A girl on a slide



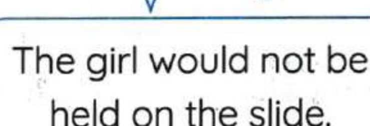
The force of gravity pulls the girl toward the ground.

The Earth-Moon System



The moon revolves in fixed orbit around the Earth due to the gravity of the Earth.

What would happen if... There were no gravity?



The girl would not be held on the slide.

The moon would float off into space.

- تتسبب قوة الجاذبية في سحب البنت لأسفل نحو الأرض.
- في حالة عدم وجود جاذبية فإن البنت لن تستطيع الثبات على الزحلوقة.
- يدور القمر حول الأرض في مدار ثابت، بفعل قوة جاذبية الأرض.
- إذا انعدمت الجاذبية بين الأرض والقمر، سيسبح القمر في الفضاء، ولن تكون هناك قوة تثبت البنت على الزحلوقة.

Check your understanding?

Put (✓) or (✗):

1. Magnetism keeps the moon in its orbit around the Earth. ( )
2. Gravitational force causes objects to move downward. ( )
3. The moon revolves in fixed orbit around the Earth due to the gravity of the Earth. ( )

Exercises on Lesson 1

1 Choose the correct answer:

1. What force would you observe when you drop your phone on the floor?
   a. Push b. Gravity c. Magnetism d. Friction
2. The Earth's gravity .... objects towards its ....
   a. pushes, center b. pulls, poles c. pulls, center d. pushes, poles
3. .... revolves around the Earth in a fixed orbit due to the Earth's gravity.
   a. Sun b. Mars c. Jupiter d. The moon
4. Gravity keeps the moon in a fixed orbit around ....
   a. the Sun b. the Earth c. itself d. another moon
5. The Earth attracts the objects towards ....
   a. its center b. the sky c. the moon d. the Sun
6. The gravity of .... affects the ocean tides on the Earth.
   a. Mars b. the moon c. Jupiter d. Sun
7. The Moon revolves around the Earth under the effect of ....
   a. the movement of Earth on its axis
   b. the movement of the Earth around the moon
   c. the Earth's gravity d. the Sun's gravity

2 Put (✓) or (✗):

1. You can see the effect of gravity when you throw a coin in the air. (   )
2. Gravity pushes the objects away from the center of the Earth. (   )
3. The gravity of the moon affects the ocean tides. (   )
4. Without the Earth's gravity, the moon would float off into space. (   )
5. There is no gravity between the moon and the Earth. (   )
6. The planets revolve around the Earth due to the gravity. (   )

3 Write the scientific term:

1. A force that pulls the objects down towards the Earth's surface. (..................)
2. The force of attraction between objects that have mass. (..................)
3. A celestial body that orbits the Earth. (..................)

4 Complete the following using the words between the brackets:

(pulling - center - Earth's gravity - Sun - orbit)

1. .... keeps the moon revolving in its .... around the Earth.
2. The gravity between .... and planets, keeps planets revolve in fixed orbits.
3. Gravity pulls the skydivers towards the .... of the Earth.
4. Gravity is a .... force.

5 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Earth's gravity	a. revolves around Earth due to the Earth's gravity.
2 Tides	b. causes skydivers to move downward.
3 The moon	c. are phenomena that occur to oceans on the Earth due to the moon's gravity.

1 .... 2 .... 3 ....

6 Give reasons for:

1. When you drop a pen, it falls down to the ground.

....

2. The moon is attracted to the Earth.

....

7 What happens if?

1. A skydiver jumps out of an airplane?

....

2. There's no gravity between the Earth and the moon?

....

Lesson 2

Activity 4 What Do You Already Know About the Effects of Gravity?

- Gravity pulls objects toward the center of Earth
- Gravity affects two objects even when they don't touch each other, such as the gravity between the Earth and the moon.

• تسحب الجاذبية الأجسام في اتجاه مركز الأرض.

• يظل تأثير الجاذبية بين جسمين موجودًا حتى وإن لم يحدث بينهما تلامس مثل قوة الجذب بين الأرض والقمر.

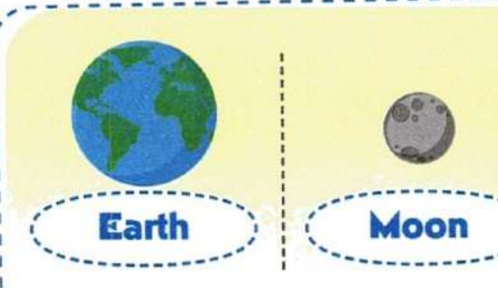
Gravity depends on



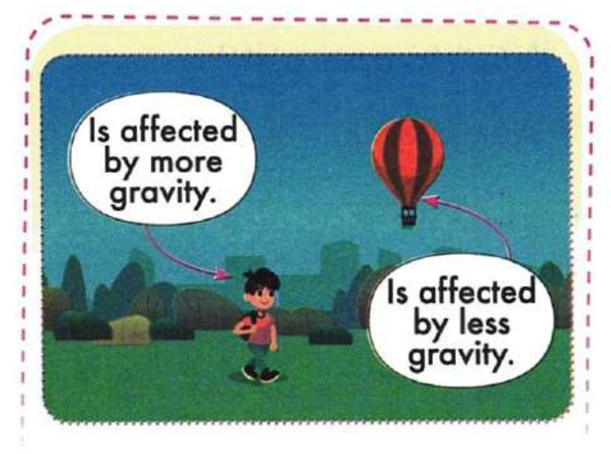
1 Mass:
The gravitational force increases when the mass of an object increases and vice versa.



2 Distance:
The gravitational force increases when the distance between two objects decreases and vice versa.

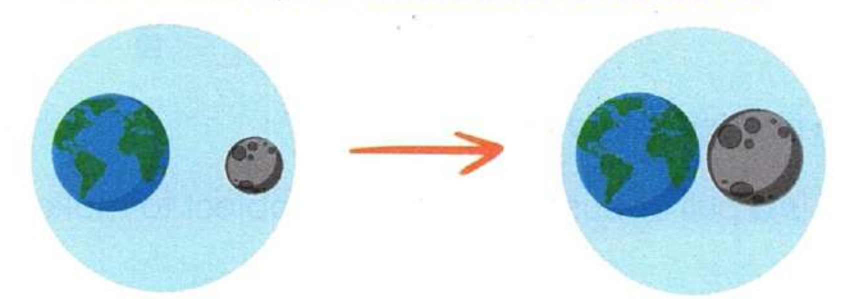


The Earth has gravity greater than the moon because it has greater mass.



What happens if?

1 The mass of the moon becomes twice its real mass?

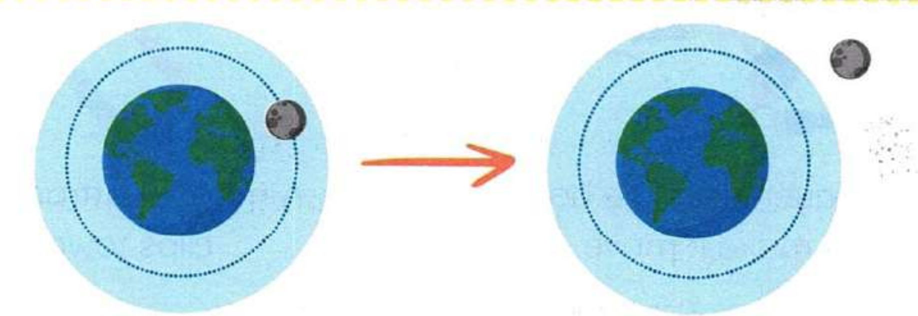


- The moon would have more gravity, so it would be pulled closer to Earth, and it might even crash into Earth.

• إذا تضاعفت كتلة القمر، تزداد قوة جاذبية القمر؛ لذلك سوف يقترب أكثر من الأرض وقد يصطدم بها.

What happens if?

2 The distance between moon and Earth becomes twice that it is?



- The gravitational attraction between them would become smaller, and the moon might float off into space.

• إذا زادت المسافة بين القمر والأرض، تقل قوة الجاذبية بينهما وقد يسبح القمر في الفضاء.

Check your understanding?

» Put (✓) or (✗):

1. The gravity of the moon is bigger than the gravity of the Earth. (   )
2. The moon revolves around the Earth due to the gravity of the Earth. (   )



Unit 4

Activity 5 Forces



How do objects move ?



- Forces are needed to make things move.

Force: It is a pull or push applied on an object to make it moves.

Motion: It is the change of the object's position relative to another object.

Force can affect objects in many different ways:

- **Forces can push or pull objects in different directions.**

Pushing force  **Pulling force**





EX: A player kicks the ball to make it move.



EX: A magnet attracts paper clips toward it.

- **Forces can be weak or strong.**

Weak force  **Strong force**





EX: The pushing force needed to move a toy car.



EX: The pushing force needed to move a real car.

Types of forces

» The following examples show different types of forces.

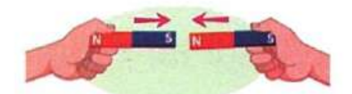
1 Magnetism

- A magnet has a kind of invisible force that cannot be seen, called magnetism.

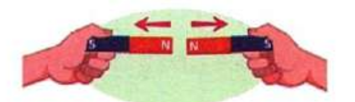
• المغناطيس له قوة غير مرئية (لا يمكن رؤيتها) تُسمى القوى المغناطيسية.

Magnetism

It is the force of attraction or repulsion between two magnets or a magnet and another object.



A magnet can pull (attract) another magnet.

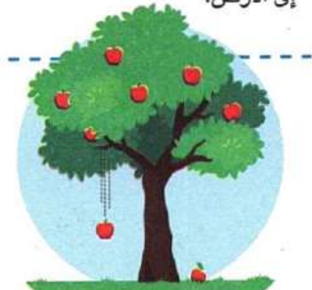


A magnet can push (repel) another magnet.

2 Gravity

- It pulls the apple toward the ground.

• تقوم قوى الجاذبية بسحب التفاحة إلى الأرض.



3 Friction Force

- Your foot exerts a force against the ground due to friction.

• تبذل قدمك قوة عند المشي؛ بسبب احتكاكها مع الأرض.



4 Wind Force

- It pushes the blades of a turbine, so they move.

• تدفع قوى الرياح أذرع التوربينات وتتسبب في حركتها.



Force causes motion.

Motion is a result of force.

Check your understanding?

Complete the following table using the given words:

(Pull or push - non-contact - pull)

	Gravity	Magnetism
Difference	It is .... force.	It is .... force.
Similarities	Both of them are .... forces.	



Exercises on Lesson 2

1 Choose the correct answer:

1. Gravitational attraction between two objects depends on the ....
   a. mass only b. distance only
   c. push force d. mass and distance
2. When the distance between the Earth and moon is doubled, the moon may ....
   a. be attracted more to Earth b. float off into space
   c. become closer to Earth d. crash into Earth
3. The gravity force depends on the .... of the object.
   a. mass b. temperature c. height d. color
4. The gravitational force of an object .... when its mass increases.
   a. equals zero b. increases c. decreases d. doesn't change
5. If the distance between the Earth and moon increases, the gravity between them ....
   a. increases b. decreases c. disappears d. doesn't change
6. As the mass of the object increases, ... increases.
   a. its movement b. its temperature
   c. its gravity d. its illumination
7. A static object needs a .... to move.
   a. time b. distance c. force d. mass
8. The force of .... is both attraction and repulsion.
   a. gravity b. magnetism c. push d. dragging
9. When two magnets are attracted to each other, they .... each other.
   a. pull b. push c. refract d. repel

10 You need to exert the greatest force to move ....

a. a magnet   b. a real bike   c. a book   c. a real car

11 Wind turbines' blades move due to the .... force of the ....

a. pull – gravity   b. push – wind

c. pull – wind   c. push – gravity

2 Put (✓) or (✗):

1 A bird flying in the sky isn't affected by the Earth's gravity. (   )

2 There's no gravity between two objects that aren't in contact. (   )

3 Objects need a force to move. (   )

4 Magnetism is the visible force of magnets. (   )

5 A magnet attracts some objects due to a force called magnetism. (   )

6 Magnetism represents a pushing or pulling force. (   )

7 Magnets attracting paper clips is evidence that magnets have a force. (   )

8 The force of a magnet is always an attraction force only. (   )

9 Some forces are strong, such as pushing a toy car. (   )

3 Write the scientific term:

1 It is a pull or push that is applied to an object. (........)

2 The change in an object's position compared to another object. (........)

3 It is the reason for the movement of any object. (........)

4 The force of attraction or repulsion between two magnets, a magnet, or another object. (........)

5 An invisible force that attracts metal objects to the magnet. (........)

6 The force between two magnets. (........)

4 Correct the underlined words:

1. Heavy objects have less gravity than smaller objects. (..................)
2. When two magnets repel, they pull each other. (..................)

5 Complete the following using the words between the brackets:

(Force – more – Gravity – magnetism – less – paper clips)

1. A person in a blimp flying in the sky is affected by .... gravity than a person standing on the ground.
2. The object with bigger mass is affected by .... gravity than that of a smaller mass.
3. .... is a pull or push that is applied to an object.
4. .... exerts only pulling force, while .... could exert pushing or pulling forces.
5. A magnet can attract ....

6 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Kicking a ball	a. increases, the gravity increases.
2 A magnet attracts a paper clip	b. is an example of pushing force.
3 Wind	c. is an example of a pulling force.
4 When the distance between two objects	d. pushes the blades of a turbine causing them to move.
5 When the object's mass	e. decreases, the gravity between them increases.

1 .... 2 .... 3 .... 4 .... 5 ....

Unit 4

7 In the following figures, which ball is affected by smallest gravitational force, and why?

....

....

Ⓐ 400 gm Ⓑ 5 gm Ⓒ 4.5 kg

8 Study the following figure:

Earth's surface

1. The force shown in the opposite figure is called .... (gravity – magnetism)
2. These two magnets repel, it means that they .... each other. (push – pull)

9 Give reasons for:

1. Gravity between two objects depends on the distance between them.

....

2. Paper clips are pulled toward a magnet.

....

10 What happens if?

1. The distance between the Earth and the moon is doubled?

....

2. The mass of the moon decreases to half?

....

3. A magnet is placed near to some paper clips?

....

4. Wind blows on the blades of a wind turbine?

....

Lesson 3





Activity 6 What Is Gravity?

Choose the correct answer:

An egg could slip out of your hand and fall to the floor due to the force of .... of the Earth that .... the egg down.

a. gravity - pushes
b. magnetism - pulls
c. gravity - pulls
d. friction - pulls



Gravity on Earth

The force of gravity keeps us from floating into space like an astronaut.



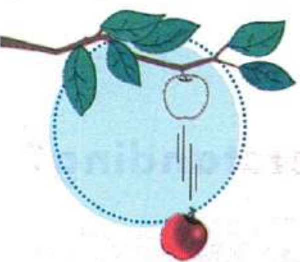
A man stands on the ground (due to the presence of the Earth's gravity)



An astronaut floats in the space (due to the absence of gravity)

We can see the effect of gravity in action, such as when something falls.





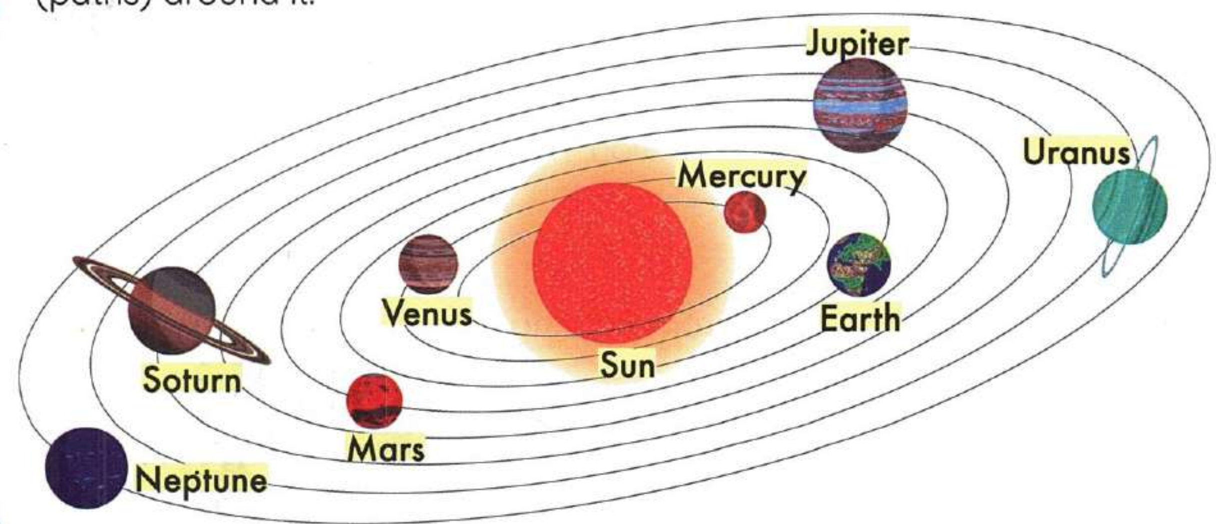


NOTE:

- Gravity doesn't only act on falling or moving objects, but also acts on objects that don't move, such as a book on the table.

Gravity in Space

- In space, there are large and small planets.
- Bigger planets have more gravity than smaller planets.
- The force of gravity of the Sun keeps the planets revolving in fixed orbits (paths) around it.



Solar System

- It contains the Sun and eight planets.

NOTE:

- Like planets in the solar system, objects on Earth with big masses have more gravity than objects with small masses.

Check your understanding?

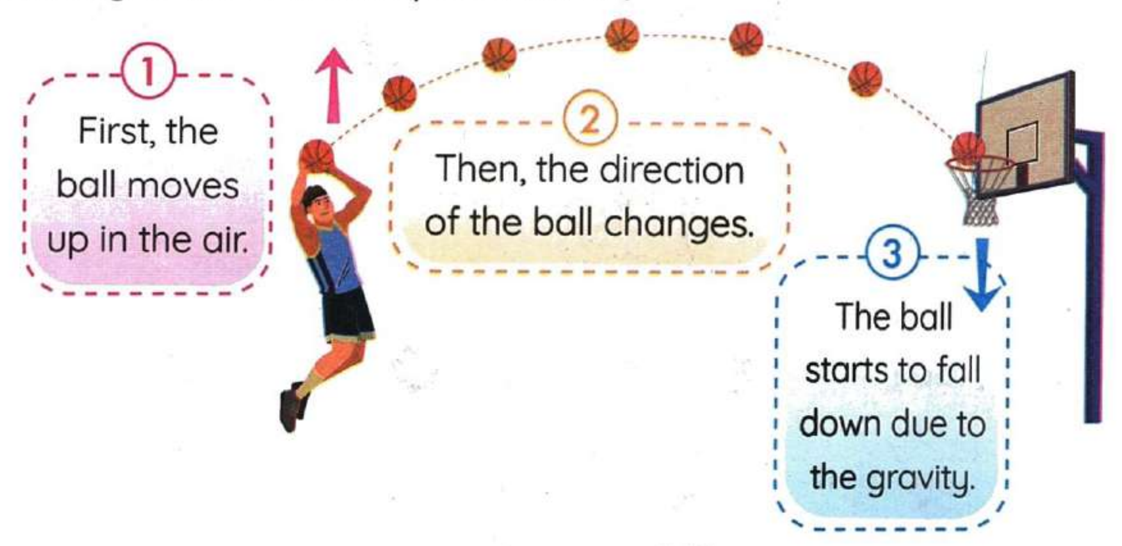
Put (✓) or (✗):

1. The skydiver floats in the air due to the absence of gravity. ( )
2. The Sun has the greatest gravitational force in the solar system.( )
3. All objects float in the air due to the Earth's gravity. ( )



What goes up, must come down.

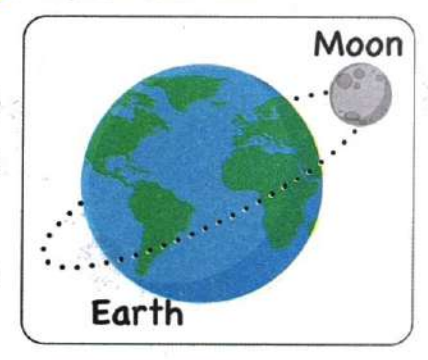
» When you throw a ball up into the air,



Relation Between Gravity and Mass

» Think about the Earth-and-moon system.

- The mass of the Earth is greater than the mass of the moon, so the Earth's gravity is greater than the moon's gravity.
- The moon stays in an orbit around Earth due to the Earth's gravity.



• فكر في نظام الأرض والقمر.

– كتلة الأرض أكبر من القمر لذلك تمتلك الأرض قوة جاذبية أكبر من القمر. – يبقى القمر في مداره حول الأرض بسبب الجاذبية الأرضية.

Check your understanding?

» **Put (✓) or (✗):**

1. Gravity always changes the object's direction when it is thrown up in the air and pulls it back downward. (   )
2. The Earth stays in an orbit around the Sun due to the Earth's gravity.(   )

Unit



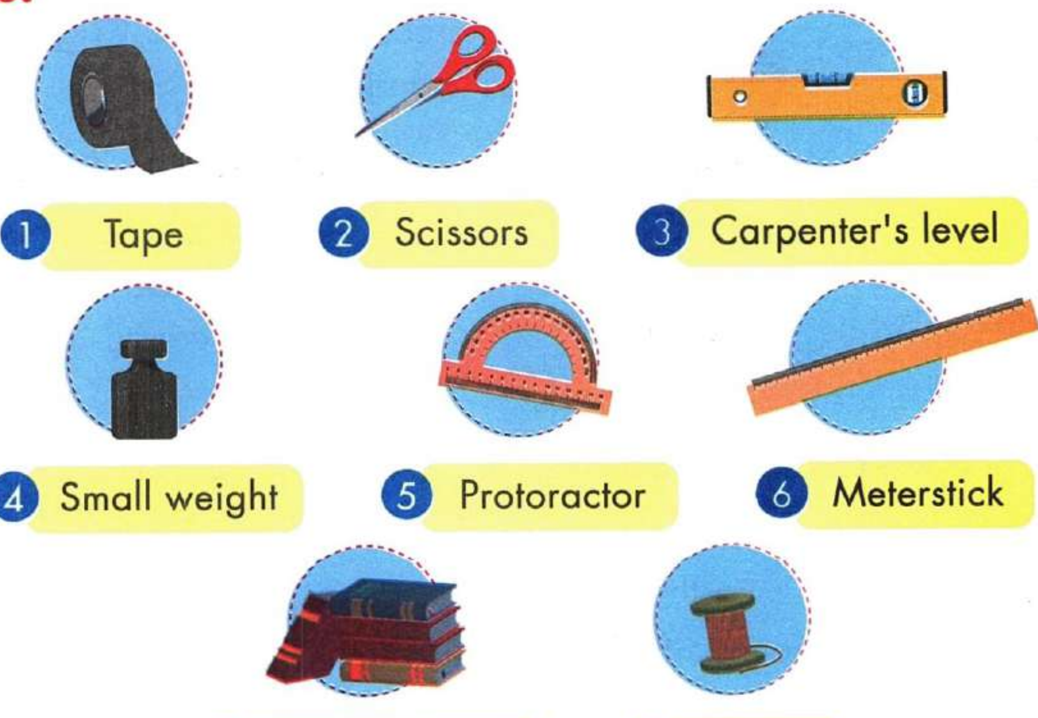


Activity 8 What Does Down Mean?

In this activity, we will investigate the angle at which an object is pulled toward the ground by the force of gravity.

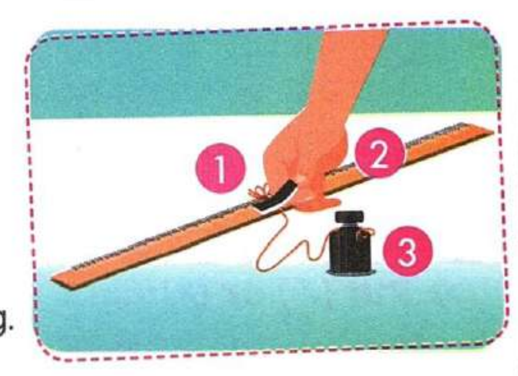
Experiment

Tools:



Steps:

1. Tie the string to the meter stick.
2. Use a piece of tape to hold the string in its place.
3. Attach the weight to the end of the string.



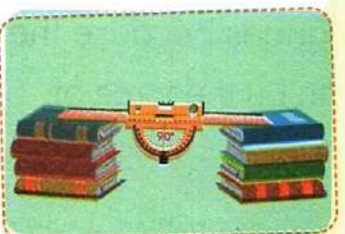
Metricstick	عصا مترية	Carpenter level	معيار الماء	String	خيط
Protractor	منقلة	Tape	شريط لاصق	Weight	ثقل

Concept

Trial 1

4 Suspend the meter stick horizontally between the books with the help of a carpenter level so that the string and the weight can move freely.

5 Measure the angle between the meterstick and the string.



Observation:

When the meterstick was horizontal,

the angle between the meterstick and the string will be 90°.

(because gravity always pulls objects downward).

Trial 2

6 Use several more books on the left side to tilt the meter stick up.

7 Measure the angle between the meter stick and the string using the protractor.



Observation:

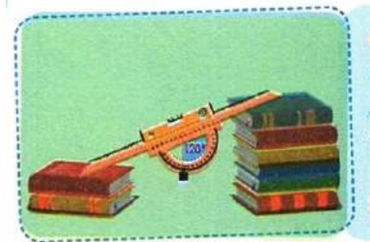
When the meterstick is tilted upward,

the angle between the meterstick and the string is less than 90° (acute angle).

Trial 3

8 Move some books away from the left side to tilt the meterstick down.

9 Measure the angle between the meterstick and the string using the protractor.



Observation:

When the meterstick is tilted downward,

the angle between the meterstick and the string is more than 90° (obtuse angle).

The factors that cause a change of the angle of measurement are:

1. The tilt of the meterstick up or down.
2. The movement of the string.

Conclusion:

As the tilt of the meterstick changes, the angel changes because the weight is always pulled toward the center of the Earth by the force of gravity.

• مع تغير ميل العصا المترية، تتغير الزاوية لأن الوزن ينجذب دائمًا نحو مركز الأرض بقوة الجاذبية

Check your understanding?

Put (✓) or (✗):

1. All objects near the Earth's surface are pulled down toward the center of the Earth. (   )
2. The direction of an object may be changed due to the Earth's gravity. (   )
3. The Earth's gravity is a repulsion force not an attraction force. (   )
4. Objects with more mass pull objects with less mass toward them. (   )

Exercises on Lesson 3

1 Choose the correct answer:

1. .... prevents us from floating off into space.
   a. Air resistance b. Gravity c. Magnetism d. Friction
2. The .... has the greatest gravity, because it has the .... mass.
   a. Sun - smallest b. moon - smallest c. Sun - greatest d. Earth - greatest
3. Gravity is the .... force between objects that have ....
   a. repulsion, mass b. attraction, mass
   c. attraction, volume d. pushing, volume
4. In the solar system, planets stay in their orbits due to the gravity of ....
   a. the moon b. the Sun c. Mars d. the Earth
5. When you throw up a ball in the air, its .... changes due to the gravity.
   a. mass b. color c. volume d. direction
6. Gravity depends on the .... of objects.
   a. color b. mass c. speed d. temperature
7. All objects on Earth are affected by the force of ....
   a. gravity b. magnetism c. pushing d. electrical
8. Which is the correct arrangement of the following objects, from smallest to greatest gravity?
   a. Elephant, Earth, Sun, Mouse b. Mouse, Elephant, Earth, Sun
   c. Sun, Earth, Elephant, Mouse d. Earth, Sun, Elephant, Mouse
9. Which sentence about gravity isn't correct?
   a. Gravity is a pulling force.
   b. Gravity changes the object's direction.
   c. Gravity depends on an object's mass.
   d. Gravity is a repulsion force.

10 When throwing an object vertically upwards, it ....

a. moves fast towards space

b. suspends in the air because its gravity is equal to that of Earth

c. returns again to Earth under the effect of gravity

d. floats in space because there is no gravity

2 Put (✓) or (✗):

1 Any object with mass has gravity. ( )

2 A book on a table isn't affected by gravity. ( )

3 If the mass of the moon decreases, its gravity force will increase. ( )

4 Gravity only affects objects in motion. ( )

5 Gravity doesn't change the direction of an object thrown up in air. ( )

6 Bigger planets have more gravity than small planets. ( )

7 If the Sun's gravity disappears, the Earth's planet will float off into space. ( )

8 The Earth's gravity keeps all planets in their orbits. ( )

9 All objects on or near the Earth's surface are pulled downward toward the Earth's center. ( )

10 You can notice the effect of gravity when a car slows down on a road. ( )

11 When you roll a pencil on the table, gravity changes its direction. ( )

3 Write the scientific term:

1 The force of attraction that exits between objects that have mass.

(....................)

2 Its gravity keeps planets revolving in fixed orbits around it.

(....................)

4 Complete the following using the words between the brackets:

(direction - more - Sun's gravity - - mass - space - center)

1 There's no gravity in ....

2 Earth has .... gravity than the moon, because Earth has more mass.

3 Without the ...., planets will float off into space.

4 The .... of a moving object changes due to the gravity.

5 The direction of the Earth's gravity is always towards the Earth's ....

6 As the .... of the object increases, its gravity increases.

5 Choose from column (A) what suits it in column (B):

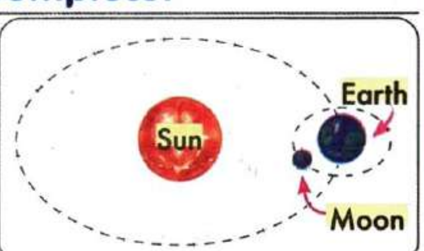
Column (A)	Column (B)
1 Astronauts float in space	a. the direction of a bike racing on a straight track.
2 Planets	b. due to the absence of gravity.
3 Gravity doesn't affect	c. revolve around the Sun in fixed orbits due to the Sun's gravity.

1 .... 2 .... 3 ....

6 Look at the following figure, then complete:

1 .... has the largest mass.

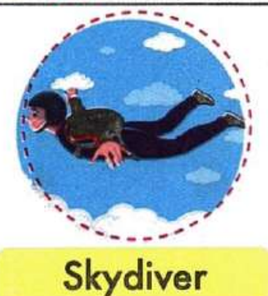
2 .... has the lowest force of gravity.



7 Study the following figures, then put (✓) or (✗):


Astronaut


Hiker


Skydiver

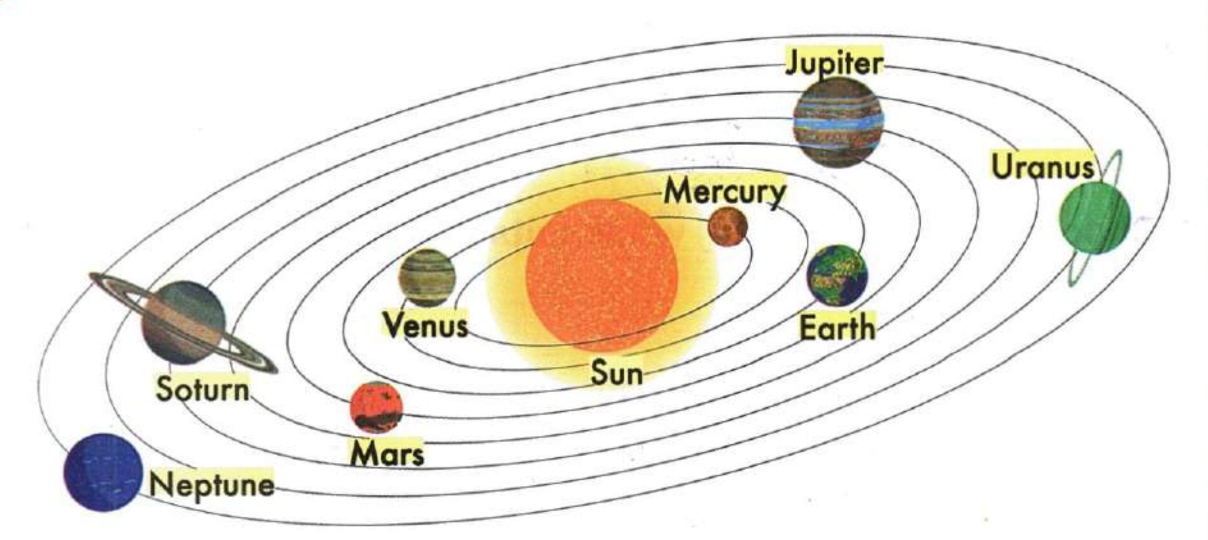
1 The skydiver floats in the air due to the absence of gravity. (   )

2 An astronaut floats in space due to the presence of gravity. (   )

3 A hiker can stand on the ground due to the moon's gravity. (   )

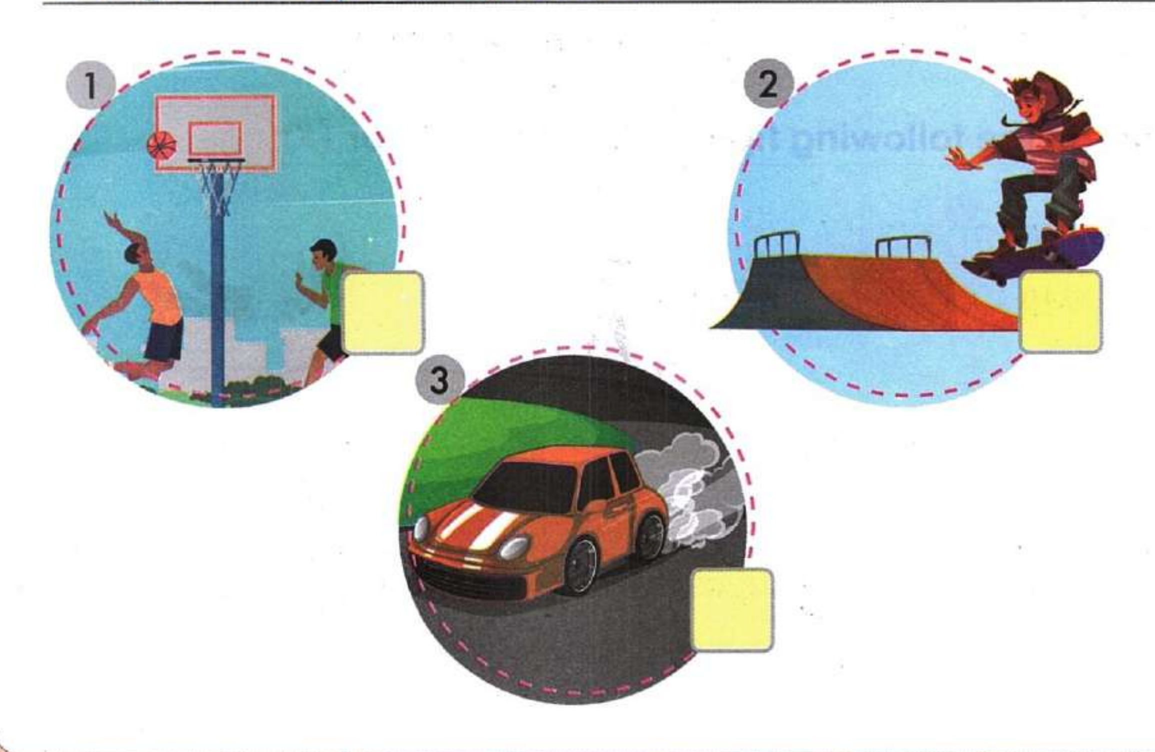
4 The hiker and the skydiver are affected by the Earth's gravity. (   )

8 Study the following figure, then put (✓) or (✗):



1. The Sun has the **biggest** gravitational force in the solar system. ( )
2. The gravity of **Mercury** is greater than the gravity of Jupiter. ( )
3. If the Sun's **gravity disappears**, the planets will stay in their orbits. ( )

9 In the following figures, check the figure in which gravity changes the object's direction:



10 Study the following figures, then choose the correct answer:

1 

2 

3 

1. The angle "L" equals .... (60° - 90°), due to the force of .... (magnetism - gravity).
2. The angle "Y" may equal .... (80° - 90°).
3. The angle "Z" may equal .... (90° - 110°).

11 Give reasons for:

1. Astronauts float into space.

   ....

2. When you throw up a ball in the air, its direction changes.

   ....

3. Gravity of the Earth is greater than gravity of the moon.

   ....

12 What happens if?

1. An egg slips out of your hand?

   ....

2. Gravity on Earth vanishes?

   ....

3. The gravity between the Sun and the planets of the solar system is absent?

   ....

Lesson 4



Activity  Pull and Gravity Around Us

» Put (✓) or (✗):

1. The Earth's gravity doesn't affect static objects. ( )
2. Gravity is a pushing or pulling force. ( )



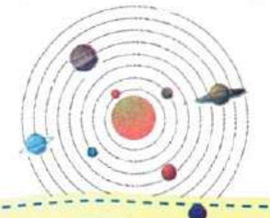
- Is a pulling force only.
- Is an invisible force.

G.R Because we can't see it, but we see its effects around us everywhere.

NOTE:

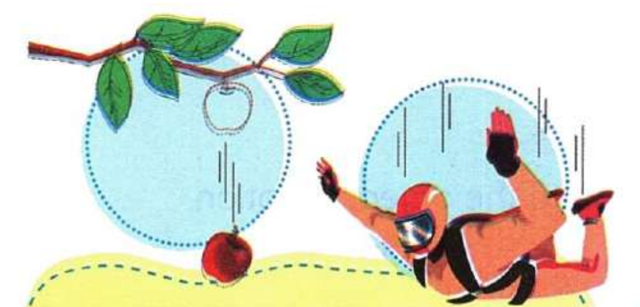
- Objects with more mass pull objects with less mass toward them.

Example of Gravity in Space



- » **The Sun pulls all planets toward it.**
- » **The planets revolve in fixed orbits around Sun due to the sun's gravity.**

Examples of Gravity on the Earth



On Earth, gravity pulls everything on or near it toward the center of the Earth.



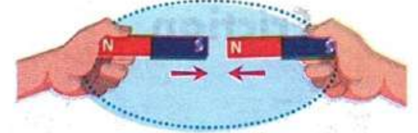
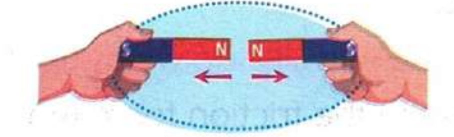
- The Earth's gravity holds rocks, animals and bodies of water on Earth.
- Gravity keeps our atmosphere around Earth.

Magnetism

- Is a pulling or pushing force.
- Is an invisible force.

» A magnet attracts some metals, such as iron, steel, nickel, and cobalt.

Examples:

A magnet can attract iron nails due to its pulling force on them.	Different poles attract (pull) each other.
	 Same poles repel (push) each other. 

Unit 4

Friction

- Friction is a force that arises between two touching surfaces.
- Friction slows the movement of objects.
- Friction acts in the opposite direction to the object's motion.

• قوة الاحتكاك تظهر دائمًا بين جسمين متلامسين.

• تقوم قوة الاحتكاك بتقليل سرعة الأجسام.

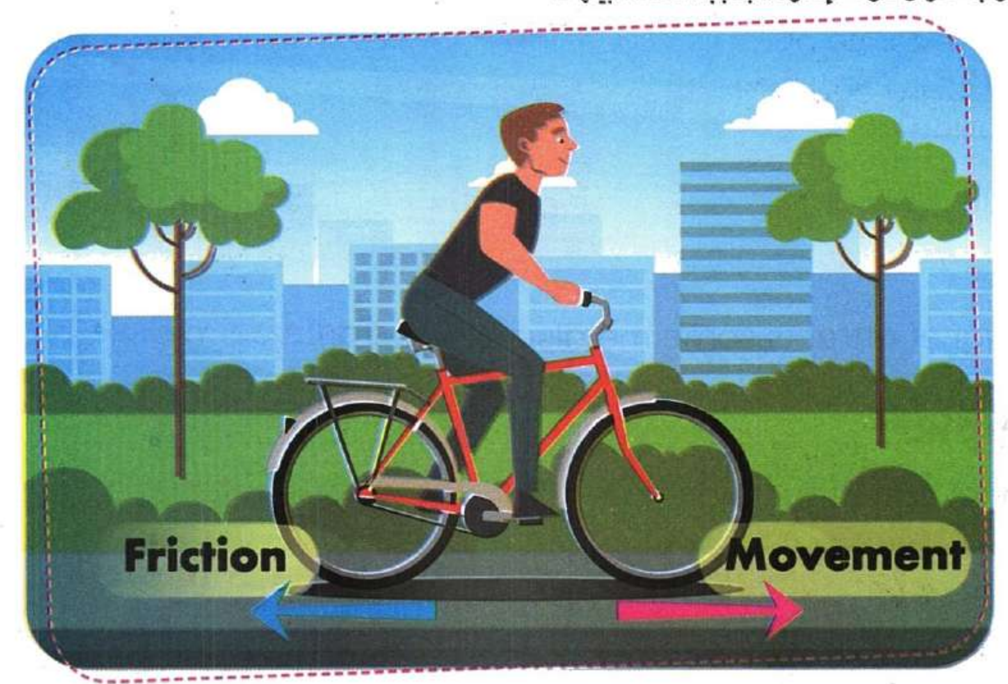
• تؤثر قوة الاحتكاك في اتجاه معاكس لاتجاه حركة الجسم.

Friction: It is a force that opposes the motion of a body across a solid surface or through a gas or liquid.

Example:

- A bicycle brake pulls back the movement of the tires by the friction of brakes against tires.

• فرامل الدرَّاجة تعرقل حركة الإطارات؛ بسبب الاحتكاك بينهما.





Your bike will stop when you stop pedaling.

Due to the friction force that slows down the bike until it stops.

Air Resistance

- Air resistance is a type of friction.
- Air resistance alowys acts against gravity.

Air Resistance	It is a force that opposes the movement of an object as it passes through air.

Example:

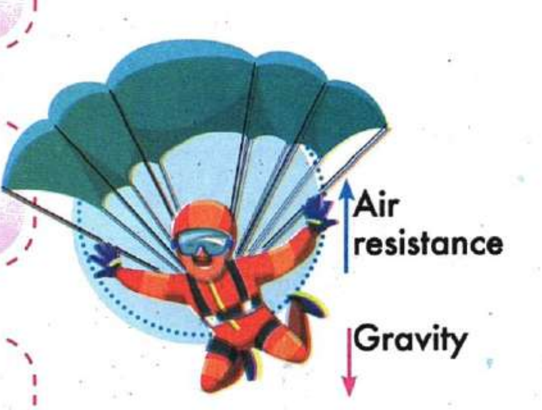
1. Skydivers release parachutes.

↓

2. Parachutes catch the upward flow of wind, creating air resistance.

↓

3. Air resistance pulls skydivers backward and slows their fall to Earth.



- يحرر هواة القفز بالمظلات أربطة المظلات لإبطاء سرعة هبوطهم.
- تحتجز المظلات الهواء المتدفق إلى أعلى؛ مما يسبب مقاومة الهواء.
- تقوم مقاومة الهواء بسحب الشخص في عكس اتجاه الجاذبية فتبطئ من سرعة سقوطه على الأرض.



Skydivers open their parachutes during landing.
To slow down their fall (drop) to Earth.

Check your understanding?

Put (✓) or (✗):

1. Skydivers open their parachutes during landing to increase their speeds. ( )
2. Gravity always attracts and never repels. ( )




Activity 10 Gravity and the Motion

Experiment



» In this activity, we will investigate the effect of gravity and air resistance on different objects.

Tools:



1 Paper clip



2 Feather



3 Plastic ball (with holes)



4 Plastic ball (without holes)

Steps - Part 1



1. Stand on a chair.



2. Drop the feather and the paper clip at the same time.



3. Observe which one reaches the ground first.

Observation:

- Paper clip would reach the ground faster than the feather.

• مشبك الورق يصل إلى الأرض أسرع من الريشة.



Conclusion:

- The feather took longer time to reach the floor because its surface area is larger than that of the paper clip, so the feather is affected by air resistance more than the paper clip.

Steps - Part ②



① Stand on a chair.



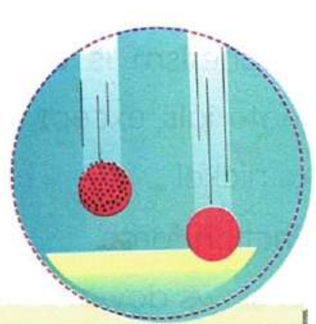
② Drop two balls at the same time from the same height.



③ Observe which one reaches the ground first.

Observation:

- The ball without holes would reach the ground faster than the ball with holes.
- الكرة المصمتة تصل إلى الأرض أسرع من الكرة ذات الثقوب.



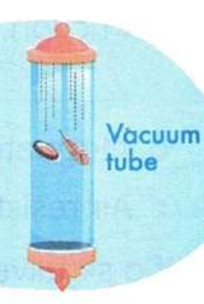
Conclusion:

- The plastic ball with holes took longer time to reach the floor because it was slowed down by the upward-flowing air that passes through the holes and increase the air resistance.

» Air resistance is a factor that can slow down falling objects.

» As the surface area of the object increases, the air resistance that acts on it increases.

Imagine that there is no air resistance on Earth:
All bodies will reach the ground at the same time because the force of gravity is constant and acts on all the bodies in the same way.



Law of motion: The force of gravity is constant and acts on all objects in the same way.

Exercises on Lesson 4

1 Choose the correct answer:

1. Gravity is the force in which the object with more mass .... another object with less mass.
   a. pushes b. reflects c. repels d. pulls
2. Which sentence represents the effect of gravity?
   a. The Earth pulls the Sun towards it. b. The moon pulls the Earth towards it.
   c. The Sun pulls the Earth towards it. d. The moon pulls the Sun towards it.
3. Magnetism is a force that attracts objects made of the following materials, except the ....
   a. nickel b. cobalt c. iron c. wood
4. Friction force .... the movement of objects.
   a. slows down b. increases c. speeds up d. doesn't affect
5. .... is considered a type of friction force.
   a. Air resistance b. Magnetism c. Gravity d. Electrical force
6. A parachute in the air is affected by the .... and ....
   a. magnetism - gravity b. water resistance - gravity
   c. gravity - air resistance d. air resistance - magnetism
7. .... force slows down your bike when pressing brakes.
   a. Friction b. Magnetism c. Gravity d. Water resistance
8. .... is a factor that acts against the gravity force.
   a. Magnetism b. The mass of an object
   c. Air resistance d. The shape of an object
9. If a skydiver opens his parachute when landing, his speed will ....
   a. become zero b. decrease
   c. not be affected d. increase

10 Which situation shows the effect of the friction force?

a. An iron nail is pulled to a magnet.

b. The Sun pulls the Earth towards it.

c. The air pulls a parachute backward.

d. A magnet pushes another magnet away.

11 Which statement is not true?

a. The air resistance slows down the parachute.

b. The gravity pulls the parachute downward.

c. The air resistance acts in the opposite direction of the force of gravity.

d. The air resistance acts in the same direction as the force of gravity.

12 When dropping the following balls from the same height, which ball will reach the ground first?

a. a 500-gram ball

b. a 600-gram ball

c. a 450-gram ball

d. a 800 -gram ball

13 When dropping identical bowling balls from different heights, the ball at .... height will reach the ground last.

a. 3 meters

b. 2 meters

c. 1 meter

d. 4 meters

14 Which statement is true if you drop a bowling ball and a feather in the absence of the air resistance?

a. The feather reaches the ground first.

b. The bowling ball is affected by more air resistance.

c. Both of them will reach the ground at the same time.

d. The feather takes longer time to reach the ground.

15 Which one of the following is affected by more air resistance when dropping them from the same height?

a. An iron nail

b. A feather

c. A hammer

d. A wooden cube

Unit 4

2 Put (✓) or (✗):

1. The Sun pulls Earth towards it as the Sun has more mass. (   )
2. The attraction force between the Sun and the Earth is less than that between the Earth and the moon. (   )
3. Gravity is an invisible force, but we can see its effects. (   )
4. Rocks and living organisms are attracted to the Earth due to its gravity. (   )
5. Planets will stay in their orbits around the Sun, if the Sun's gravity disappears. (   )
6. All metallic objects are attracted to magnets. (   )
7. A magnet has the force of attracting metals, such as silver and gold. (   )
8. Friction force opposes the motion of an object that moves through liquids only. (   )
9. The air resistance pulls a skydiver down towards the ground. (   )
10. A parachute helps in increasing the speed of the object falling to the ground. (   )
11. The air resistance opposes the movement of objects through air. (   )
12. Air resistance is a type of friction force that can be seen easily. (   )
13. In the absence of air resistance, a parachute will drop faster to the ground. (   )
14. Both gravity and air resistance act in opposite directions to each other. (   )
15. A paper clip reaches the ground before a feather. (   )
16. If there is no air resistance, all objects fall to the ground at the same speed. (   )

3 Write the scientific term:

1. The force that holds you on the ground. (..........................)
2. The force of the magnet that pulls some metal objects toward it. (..........................)
3. The force that opposes the movement of an object across a solid surface, liquids, or gases. (..........................)
4. A type of friction force that slows down the falling of objects in the air. (..........................)
5. The force that causes skydivers to move downward. (..........................)
6. A tool that the skydiver uses to slow his drop. (..........................)

4 Correct the underlined words:

1. Friction force <u>speeds up</u> the movement of the object. (..........................)
2. <u>Gravity</u> is the force that pulls objects made of iron to a magnet. (..........................)
3. <u>Water resistance</u> pushes a parachute up against gravity. (..........................)
4. <u>Magnetism</u> is the upward force which is exerted against a falling object in the air. (..........................)

5 Complete the following using the words between the brackets:

(gravity - an opposite - magnetism - brakes - slows down - friction - pulls)

1. The bike's .... depend on the .... force between brakes and tires.
2. Friction force acts in .... direction of the object's movement.

3 Air resistance .... skydiver backward and .... his drop to the Earth's surface.

4 The force that changes the direction of a ball thrown up in the air is called ....

5 A medal made of nickel will be pulled to a magnet due to a force called ....

6 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Air resistance	a. are tools used to slow down the skydiver's landing.
2 Magnetism	b. keeps the atmosphere around the Earth.
3 Parachutes	c. is a type of friction force.
4 Gravity	d. are tools used to slow down a bike's speed.
5 Brakes	e. is the force of the magnet to pull some metals.

1 .... 2 .... 3 .... 4 .... 5 ....

7 Answer the following questions:

Which of the following bodies reaches the ground first in the following cases and why?

1



Feather

or



A paper clip

because ....

2



A metallic ball with 30 kilograms

or



A wooden ball with 5 kilograms

because ....

3



A flat paper

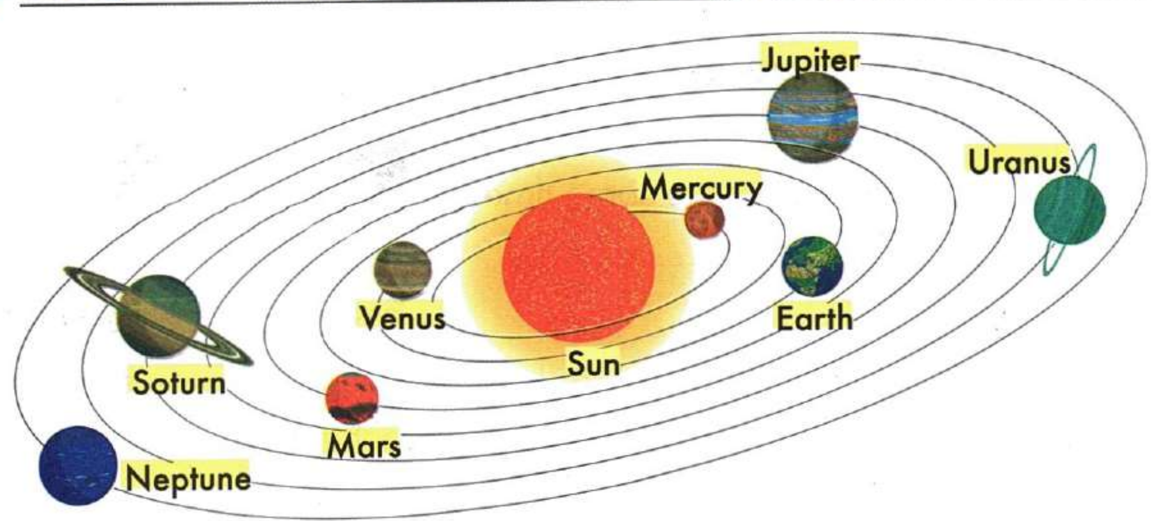
or



A crumpled paper

because ....

8 Study the following figure, then put (✓) or (✗):



1. The gravity force between Sun and Jupiter is more than that between Sun and Mercury. ( )
2. Earth has more gravity than that of Jupiter, because Earth has bigger mass. ( )

Unit 4

9 Study the opposite figure, then put (✓) or (✗):

Force (B)
Force (A)

1. Force (B) is a type of friction force. ( )
2. Force (A) slows down the drop of the skydiver. ( )
3. Force (B) is always a pulling force. ( )

10 Study the opposite figures, then put (✓) or (✗):

Skydiver (1) Skydiver (2)

1. Skydiver number (1) drops slower than skydiver number (2). ( )
2. Skydiver number (2) will reach the ground first. ( )
3. The parachute of skydiver number (1) is affected by more air resistance than that of the skydiver number (2). ( )

11 In the following figures:

Air | Vacuum

Figure (1) | Figure (2)

1. In which figure the feather and the ball will reach the ground at the same time?

....

2. Choose:

In figure (1), if the feather reaches the ground in 10 seconds, so the ball takes .... (15 – 10 – 8) seconds to reach the ground.

12 Give reasons for:

1. The presence of atmosphere around Earth planet.

....

2. Paper clips are pulled toward the magnet.

....

3 Your bike will stop when you stop pedaling.

....

4 The skydiver lands safely when he opens his parachute.

....

5 A skydiver's drop slows down, when he opens the parachute.

....

6 A feather takes a longer time than a paper clip to reach the ground if they are thrown from the same height.

....

13 What happens if?

1 You approach a magnet to a mixture with sand and iron nails?

....

2 The gravity on Earth disappears?

....

3 The moon has greater mass than of the Earth?

....

4 You press the brakes on your bike?

....

5 A skydiver opens his parachute when landing?

....

6 You throw a stone and paper from your balcony?

....

7 Two similar balls are thrown from the same height?

....

8 You drop a hammer and an iron nail from the same height, if there's no air resistance on Earth?

....

Lesson 5



Activity 11 The Revolving Planets

In 1543, a scientist called Nicolous Copernicus stated that: Earth revolves around the Sun.



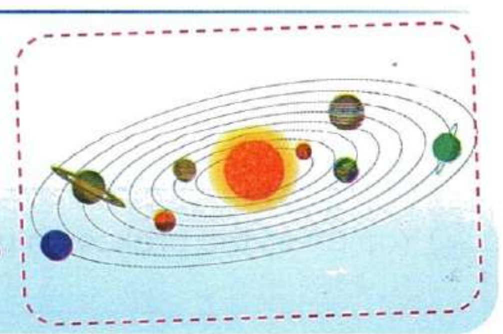
- In the solar system, each planet revolves around the Sun on a fixed path called an orbit.
- The orbit of each planet has an ellipse (oval) shape.
- Earth revolves around the sun at a speed that nearly equals 107,000 km per hour.

في عام 1543، ذكر نيكولاس كوبرنيكوس أن الأرض تدور حول الشمس.

- في النظام الشمسي، يدور كل كوكب حول الشمس في مسار محدد يُطلق عليه المدار.
- المدار: عبارة عن دائرة مفلطحة أو شكل بيضاوي.
- يدور كوكب الأرض حول الشمس بسرعة 107,000 كم في الساعة.

What keeps the planets revolve around the Sun in fixed orbits?

- The great gravitational pulling force of the Sun keeps the planets revolving in fixed orbits around it.



ما الذي يجعل الكواكب تدور في مدارات ثابتة حول الشمس؟

- قوة جاذبية الشمس القوية تحافظ على بقاء الكواكب في مدارات ثابتة حولها.

What happens if?

The gravity of the Sun disappears?

All planets would float off into space.



The Sun is considered the center of motion in the solar system.

Because the Sun has the greatest mass in the solar system, so it has the greatest gravity that makes all planets revolve around it in fixed orbits.



Activity 12 Record Evidence Like a Scientist: Gravity

- In this concept, you have learned about the effects of gravity.
- Now, try to think like a scientist by writing your claim, evidence, and scientific explanation about one of the main points of this concept through the four steps you have learned in the first concept.

Question:

- How does gravity affect the movement of objects?

My Claim:

- ....

....

Evidence:

- ....

....

Scientific Explanation with Reasoning:

- ....

....

Exercises on Lesson 5

1 Choose the correct answer:

1. .... locates at the center of the solar system .
   a. The Sun b. Mars c. The Earth d. The moon
2. .... stated that the Earth revolves around the Sun.
   a. Newton b. Einstein c. Galileo d. Copernicus
3. The orbit that each planet revolve in around the Sun has .... shape.
   a. a circular b. an oval
   c. a zigzag d. a rectangular
4. The solar system consists of ....
   a. the Sun and moon only b. the Sun and group of planets
   c. the Sun and Earth only d. a group of planets only
5. Earth revolves around the Sun at a speed nearly equals ....
   a. 107,000 m per second b. 107,000 km per hour
   c. 1,070 km per hour d. 1,070 m per second

2 Put (✓) or (✗):

1. Gravity is an invisible pushing force between objects. ( )
2. Gravitational force keeps all planets revolve in fixed orbits around the Sun. ( )
3. The Sun is located in the center of our galaxy. ( )
4. The Sun revolves around the Earth. ( )
5. The Earth's gravity keeps all planets in their orbits. ( )
6. The orbit of each planet has an ellipse shape. ( )
7. All planets revolve around the Sun in fixed circular orbits at the same speed. ( )

3 Write the scientific term:

1. The center of the solar system. (..................)
2. The force that holds all planets in their orbits around the sun. (..................)
3. The fixed path where planets revolve around Sun. (..................)
4. The system that includes the Sun and a group of planets. (..................)

4 Complete the following using the words between the brackets:

(an ellipse – the solar system – Sun – an orbit)

1. The solar system includes the .... at its center and eight planets around it.
2. The Sun locates at the center of ....
3. Earth revolves around the Sun in the shape of .... orbit.
4. In the solar system, each planet in fixed path called ....

5 Give reasons for:

1. The Sun is considered the center motion of the solar system.

....

2. Planets revolve around the Sun in fixed orbits.

....

6 What happens if?

- The gravity of the Sun disappears?

....

....

Model Exams on Concept 4.1

Model Exam 1

Question 1

(A) Choose the correct answer:

1. All objects on Earth are affected by a/an .... force.
   a. gravity b. magnetism c. pushing d. electrical
2. The materials that are attracted to magnets are ....
   a. iron and nickel b. aluminium and copper
   c. silver and gold d. aluminium and silver
3. Friction force .... the movement of objects.
   a. slows down b. increases c. speeds up d. doesn't affect
4. Which one of the following is affected by more air resistance when dropping them from the same height?
   a. An iron nail b. A feather c. A hammer d. A wooden cube

(B) What happens if? You drop a book and an iron nail from the same height if there's no air resistance on Earth?

Question 2

(A) Choose from column (A) what suits it in column (B):

(A)	(B)
1 Magnetism	a. is a type of friction force that slows down the falling of objects in the air.
2 Object's mass	b. is the change object's position related to another object
3 Motion	c. is the force of the magnet.
4 Air resistance	d. is a factor that affects the force of gravity.

(B) Give a reason for: The gravity of the Earth is greater than that of the Moon.

Question 3

(A) Put (✓) or (✗):

1. The attraction force between the Sun and the Earth is less than that between the Earth and the moon. ( )
2. The gravity between the Sun and planets keeps planets revolve in fixed orbits. ( )
3. The force of a magnet is always an attraction force only. ( )
4. In the absence of air resistance, a parachute will drop faster to the ground. ( )

(B) Write the scientific term:

The force that arises between two touching surfaces and slows the motion. (........)

Model Exam 2

Question 1

(A) Choose the correct answer:

1. Which statement of the following about gravity is not true?
   a. Gravity is a pulling force. b. Gravity changes the object's direction.
   c. Gravity depends on an object's mass. d. Gravity is a repulsion force.
2. The .... is the factor that acts against the force of gravity.
   a. magnetism b. mass of an object c. air resistance d. shape of an object
3. The force of .... could be a pulling or pushing force.
   a. magnetism b. gravity c. friction d. electricity
4. If the moon's mass is doubled, ...
   a. its distance away from the Earth is doubled
   b. the moon may collide with the Earth
   c. it is attracted less to Earth d. it goes away from Earth

(B) Write the scientific term:

A celestial body that orbits the Earth due to the Earth's gravity. (..........)

Question 2

(A) Put (✓) or (✗):

1. A parachute helps in increasing the speed of an object falling to the ground. ( )
2. The force of gravity is always an attraction force only. ( )
3. Sun pulls Earth towards it as the Sun has greater mass than Earth. ( )
4. The gravity changes the direction of any object throwing into the air, making it fall down toward the Earth. ( )

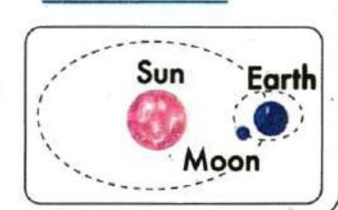
(B) What happens if? The distance between the moon and the Earth is doubled?

Question 3

(A) Correct the underlined words:

1. Friction force affects in the <u>same</u> direction of the object's motion.
2. <u>Earth's</u> gravity keeps the planets revolving in their orbits around it.
3. An astronaut floats in space due to the absence of <u>magnetism</u>.
4. A static ball needs <u>mass</u> to move.

(B) Look at the opposite figure, then answer:



1. .... has the largest mass.
2. .... has the lowest force of gravity.



Concept 2

Patterns of Motion in the Sky

Concept Objectives:

By the end of this concept, students will be able to:

- Develop models that describe how the movement of Earth in space causes cyclical patterns of night and day, seasons and the apparent movement of the Sun, planets and stars.
- Analyze and interpret data to evaluate the claim that sunrise times differ in different cities and over time and describe patterns in sunrise times.
- Model patterns of daily changes in the length and direction of shadows, day and night and the appearance of changes in the moon in the night sky.

Key Vocabular

- Axis
- Constellation
- Cycle
- Orbit
- Revolution
- Rotation
- Tilt
- The apparent motion of the Sun

Concept 2

Patterns of Motion in the Sky

Lesson 1	
Activity 1	Can You Explain?
Activity 2	Day and Night
Activity 3	What Do You Already Know About Patterns of Motion in the Sky?
Lesson 2	
Activity 4	Rotation
Activity 5	Sunrise
Lesson 3	
Activity 6	Effects of Earth's Rotation
Activity 7	What Can Shadows Tell Us?
Activity 8	Constellations Visible During Different Seasons
Lesson 4	
Activity 9	Constellations
Activity 10	Phases of the Moon
Lesson 5	
Activity 11	What Are Stars?
Activity 12	How Do We Study the Stars?
Lesson 6	
Activity 13	Record Evidence Like a Scientist: Day and Night
Activity 14	Planetarium Director and the Stars

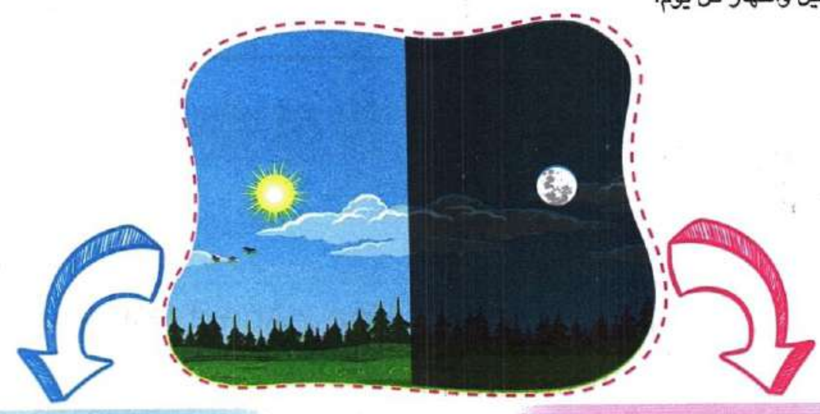
Lesson 1



Activity 1 Can You Explain?

» You can observe the cycle of day and night every day.

• يمكنك ملاحظة تعاقب الليل والنهار كل يوم.



During the day



• You can observe shadows of objects move.

• يمكنك ملاحظة تغيُّر موقع الظل.

During the night



• You can observe the moon, and some stars appear to move across the sky.

• يمكنك رؤية القمر، وبعض النجوم تظهر كأنها تتحرك في السماء.

Earth rotation around its axis causes:

1. The regular pattern of day and night.
2. The movement of objects' shadows throughout the day.
3. The Sun, planets and stars appear to move across the sky.



يتسبَّب دوران الأرض حول محورها في:

1 تعاقب الليل والنهار.
2 تحرُّك الظل خلال اليوم.
3 رؤية الشمس والكواكب والنجوم تتحرَّك في السماء.



Concept 2

- Earth rotates (spins) all the time.
- Earth takes a whole day (24 hours) to make one complete turn on its axis.
- The apparent motion of the Sun is due to the Earth's rotation on its axis.

• تدور الأرض طوال الوقت.

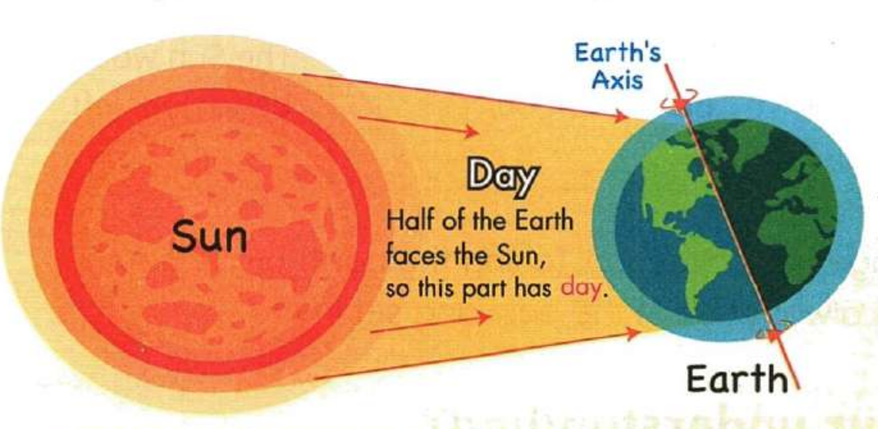
• تستغرق الأرض يومًا كاملًا (24 ساعة) لتقوم بدوران كامل حول محورها.

• تحدث الحركة الظاهرية للشمس؛ بسبب دوران الأرض حول محورها.

Earth's axis It is an imaginary line passing through North and South Poles of Earth.

محور الأرض: هو خط افتراضي (تخيلي) يمر من القطب الشمالي إلى القطب الجنوبي.

During Earth's Rotation



Night

The other half of the Earth facing away from the Sun doesn't receive any light, so this part has night.

We cannot feel the Earth spinning, but we know that from the regular pattern of day and night.

Check your understanding?

Put (✓) or (✗):

- The phenomenon of the regular pattern of day and night happens due to Earth's rotation on its axis. (   )



Activity 3 What Do You Already Know About Patterns of Motion in the Sky?



Where is the Sun in the sky?

- The Sun appears to change its position in the sky during the day.
- The Sun rises in the east and sets in the west.

Imagine that you are facing the north direction of the Earth

In the early morning
(The Sun rises in the east.)



The Sun would be to your right.

At noon
(The Sun is in the center of the sky.)



The Sun would be above you.

In the late afternoon
(The Sun sets in the west.)



The Sun would be to your left.

NOTE:
If you change your direction, facing the north or the south, the Sun will always rise in the east and set in the west.

Check your understanding?

- ***Adam took different pictures during the day for a tree that is located in the north direction of the Earth. Complete the following sentences using the words from the brackets:***

(10 a.m. – 12 p.m. – 2 p.m.)

1. Picture (a) was taken at ....
2. Picture (b) was taken at ....
3. Picture (c) was taken at ....


(a)


(b)


(c)

Rotation or Revolution

Rotation	Revolution
• It is the spinning of an object around its axis. • هو دوران الجسم حول محوره.	• It is the orbiting of an object around another object. • هو دوران الجسم في مسار حول جسم آخر.
North Pole Axis South Pole	Orbit Sun Earth
Examples	
• Earth rotates around its axis once every day.	• Earth revolves around the Sun in an orbit.

- An axis is an imaginary line that runs through the center of an object.
  - المحور هو خط افتراضي يمر بمركز جسم ما.

- An orbit is an imaginary path where an object revolves around another object.
  - المدار هو مسار تخيلي يدور فيه الجسم حول جسم آخر.

Check your understanding?

» Complete the following sentences using the words in brackets:

1. Earth (revolves - rotates) on its axis every (24 hours - year).
2. Earth (revolves - rotates) around the Sun every (24 hours - year).

Exercises on Lesson 1

1 Choose the correct answer:

1. Earth takes .... to rotate once on its axis.
   a. a whole day b. 24 days c. 12 hours d. 48 hours
2. Earth takes .... to make two successive turns around its axis.
   a. 24 hours b. 48 hours c. a whole day d. 12 hours
3. The .... of Earth is an imaginary line passing through the North and South Poles of Earth.
   a. Equator b. orbit c. axis d. axle
4. Day and night phenomenon occurs due to the rotation of Earth around ....
   a. the Sun b. its axis
   c. the moon d. the solar system
5. The rotation of Earth around its axis leads to ....
   a. the moon rotating around the Earth in a fixed orbit
   b. the Sun appearing to not be moving in the sky
   c. the regular pattern of day and night.
   d. the regular pattern of the four seasons
6. If one part of the Earth receives sunlight for 14 hours a day, the other part of the Earth receives sunlight for .... a day.
   a. 14 hours b. 12 hours c. 10 hours d. 24 hours
7. The sequence of day and night results from the ....
   a. revolution of the Earth around the Sun
   b. rotation of the Earth on its axis
   c. revolution of the Sun around the Earth
   d. rotation of the Sun on its axis
8. You can see the Sun in the east at ....
   a. 7 p.m. b. 8 a.m. c. 5 p.m. d. 12 a.m.

9. The Sun always rises in the .... and sets in the ....
   a. west - east b. south - west
   c. east - south d. east - west
10. .... is a phenomenon happening when half of the Earth doesn't receive any sunlight.
   a. Night b. Day c. Winter d. Spring

2 Put (✓) or (✗):

1. You can feel the spinning of the Earth around its axis. (   )
2. The Sun, stars and moon appear to move across the sky due to the Earth's rotation. (   )
3. The movement of a tree's shadow during daytime results from the spinning of Earth around its axis. (   )
4. Day and night pattern occurs due to the rotation of Earth around the moon. (   )
5. The Earth revolves around the Sun once every 24 hours. (   )
6. The Earth takes 12 hours to make a complete cycle on its axis. (   )
7. All parts of the Earth face the Sun all day. (   )
8. The Sun appears in the same place in the sky all day. (   )
9. When you travel to another country, the Sun will be moving from the east to the west. (   )
10. The orbiting of Earth around the Sun is called rotation. (   )

3 Write the scientific term:

1. It is a phenomenon that results from the Earth's rotation around its axis. (..................)
2. It is an imaginary line passing through the North and South Poles of the Earth. (..................)
3. It is the time taken by the Earth to complete one rotation on its axis. (..................)

4. It is a phenomenon that happens when half of the Earth faces the Sun. (..................)

5. It is a phenomenon that happens when half of the Earth doesn't receive any sunlight. (..................)

4 Complete the following using the words between the brackets:

(middle – axis – revolves – rotates – west – day – east – night)

1. When half of the Earth faces the Sun, it has .... and the other half has ....
2. The Sun can be seen above in the center of the sky in the .... of the day.
3. The Sun appears to move from the .... to the ....
4. The Earth .... around its .... every 24 hours.

5 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Earth's axis	a. is the orbiting of Earth around the Sun.
2 Earth's revolution	b. is the spinning of Earth on its axis.
3 Earth's rotation	c. once every 24 hours.
4 Earth spins around itself	d. passes through the two poles of the Earth.

1 .... 2 .... 3 .... 4 ....

6 Study the following figure, then choose:

1. Which location is experiencing daytime?
   a. Location (A) because it is facing the Sun.
   b. Location (B) because it is facing the Sun.
2. Which location on Earth is turned away from the Sun?
   a. Location (A)
   b. Location (B)

7 In the following figure, which statement is true?



a) The Sun will reach the east in less than 6 hours.
b) The Sun will set in less than 6 hours.
c) The figure shows the early morning.
d) The figure shows the location of the Sun at noon.

8 Study the following figures, then put (✓) or (✗):

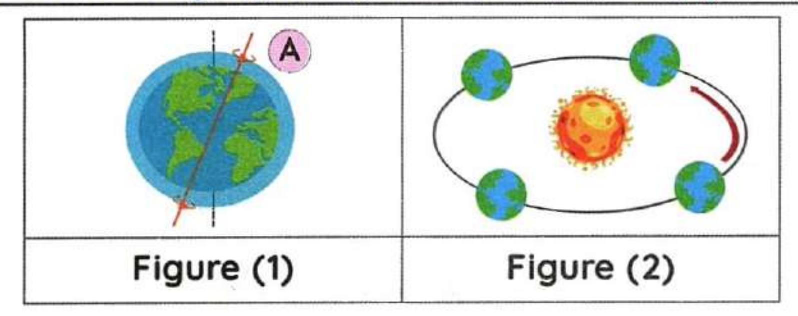


Figure (1)	Figure (2)

1. Figure (1) shows the Earth's rotation on its axis. ( )
2. Figure (2) represents the revolution of the Sun around the Earth. ( )
3. The cycle of day and night occurs due to the movement of the Earth in figure (1). ( )
4. The line (A) in figure (1) is a real line that passes through the Earth's two poles. ( )

9 Give reasons for:

1. The day and night phenomenon occurs.
....
2. The Sun appears to move across the sky from the east to the west.
....

10 What happens if:

1. The Earth rotates on its axis?
....
2. The Earth stops spinning around its axis?
....
3. Half of the Earth faces the Sun?
....

Concept 2

Lesson 2



Activity  Rotation



Choose the correct answer:

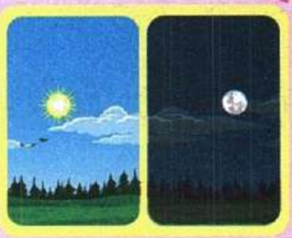
If you look at a globe, you will notice that the Earth spins around its (orbit - axis), which runs vertically through the Earth's (Poles - Equator).

Cycle It is a series of events that are repeated in the same order.

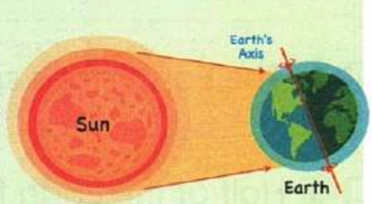
هي سلسلة من الأحداث تتكرّر بنفس الترتيب.

Examples of Cycles

Cycle		Reason
The cycle of day and night	is a result of	• Earth's rotation around its axis every 24 hours (one day)
The cycle of the four seasons	is a result of	• Earth's revolution around the Sun every year



Cycle of day and night:



- Earth rotates counterclockwise (from the west to the east) on its vertical axis, which passes through the two poles of Earth, causing the cycle of day and night.

- تدور الأرض عكس عقارب الساعة من الغرب إلى الشرق حول محورها الذي يمر بمركزي الأرض، مما يؤدي لتعاقب النهار والليل.

What happens if?

1 The Earth stops spinning on its axis.

- The cycle of day and night will not happen.

2 The Earth takes 12 hours only to spin on its axis.

- The cycle of day and night will be repeated every 12 hours.

Solar System



- The solar system includes **one star**, which is the **Sun**, and **eight planets** that revolve around the Sun in fixed orbits.
- Planets rotate on their axes at different speeds.
- Jupiter is the **fastest-rotating planet** on its axis in the solar system.

• تتكوَّن المجموعة الشمسية من الشمس وثمانية كواكب تدور حول الشمس في مدارات محددة.

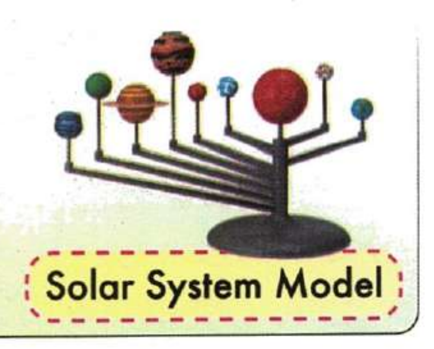
• تدور الكواكب حول محاورها بسرعات مختلفة.

• يُعد كوكب المشتري أسرع كوكب يدور حول محوره في المجموعة الشمسية.

Check your understanding?

Choose the correct answer:

If you look at a solar system model, you will notice that planets (rotate - revolve) around the Sun in fixed (axes - orbits).



Solar System Model

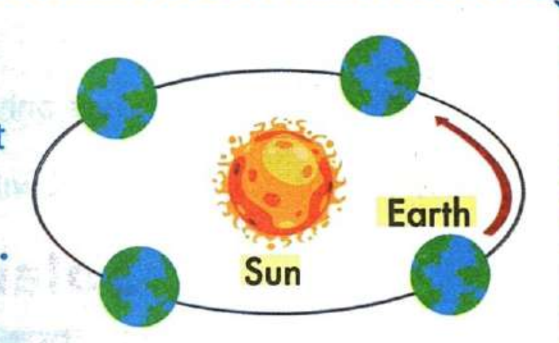


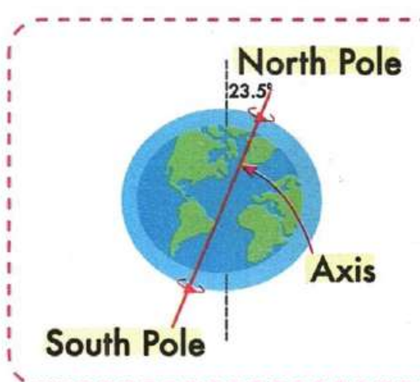
Unit 4

Activity 5 Sunrise

- Earth's path around the Sun is not perfectly circular; it is an elliptical orbit (oval path) like an elongated circle.

• مسار الأرض حول الشمس ليس دائريًا تمامًا، ولكنه بيضاوي الشكل مثل دائرة ممدودة.





- Earth is slightly tilted on its axis.
- The angle of tilt changes throughout the year.

• دوران الأرض حول محورها يكون بشكل مائل قليلًا.

• تتغيَّر زاوية الميل على مدار العام.

Both:

1. The elliptical orbit of the Earth
2. The tilt of the Earth on its axis

cause

- The Sun to appear to travel across the sky at slightly different speeds each day.
- The difference in the time of sunrise and sunset each day.

• **يؤدي الجمع بين مدار الأرض البيضاوي وميل الأرض حول محورها إلى:**

1. ظهور حركة الشمس في مسارات مختلفة عبر السماء بسرعات مختلفة على مدار اليوم.
2. اختلاف أوقات شروق الشمس وغروبها كل يوم على الأرض.

Concept 2

» Now, let's study the sunrise and sunset in some cities in Egypt.

- The Sun rises in the east and sets in the west.
- The cities in the east see the sunrise before the cities in the west.

• تشرق الشمس من الشرق، وتغرب الشمس من الغرب. • المدن التي تقع في الشرق تشرق الشمس فيها قبل المدن التي تقع في الغرب.

For example:

- The following two tables show the sunrise, sunset and the length of day from Dec. 1 to Dec. 3 in two different cities in Egypt, which are:



In Siwa

A city in the far west of Egypt

Day	Sunrise	Sunset	Length of Day
Dec. 1	6:54 a.m.	5:19 p.m.	10:24:55
Dec. 2	6:55 a.m.	5:19 p.m.	10:24:08
Dec. 3	6:55 a.m.	5:19 p.m.	10:23:23

In Marsa Alam

A city in the far east of Egypt

Day	Sunrise	Sunset	Length of Day
Dec. 1	6:08 a.m.	4:50 p.m.	10:41:44
Dec. 2	6:09 a.m.	4:50 p.m.	10:41:05
Dec. 3	6:09 a.m.	4:50 p.m.	10:40:28

» From the previous tables, we can conclude the following information:

- Marsa Alam sees the sunrise 46 minutes before Siwa.
- The length of day decreases in Marsa Alam and Siwa from Dec.1 to Dec 3.
- The length of day in Marsa Alam is always longer than it is in Siwa.

• الشمس تشرق في مدينة مرسى علم قبل واحة سيوة بحوالي 46 دقيقة.

• يقصر طول النهار في مدينتي مرسى علم وسيوة خلال الفترة من 1 ديسمبر إلى 3 ديسمبر.

• طول النهار في مدينة مرسى علم دائمًا أطول من طول النهار في مدينة سيوة.

Exercises on Lesson 2

1 Choose the correct answer:

1. The cycle of .... results from the revolution of the Earth around the Sun.
   a. moon phases b. day and night
   c. seasons d. ocean tides
2. The number of stars in the solar system is ....
   a. one b. eight
   c. nine d. two
3. The solar system includes ....
   a. the moon only b. the planets only
   c. the Sun and planets d. the stars and galaxies
4. .... is the fastest-rotating planet on its axis in the solar system.
   a. Jupiter b. Earth
   c. Mars d. Mercury
5. The Earth orbits around the .... in .... path.
   a. Sun – a rectangular b. Milky Way – an oval
   c. Sun – an elliptical d. Moon – a circular
6. The Earth's axis is ....
   a. vertical b. horizontal
   c. circular d. real
7. The day on Jupiter is .... the day on Earth.
   a. longer than b. shorter than
   c. equal to d. the same hours as
8. If the speed of Earth's rotation on its axis increases, the day length on it may be equal to ....
   a. 24 hours b. 25 hours
   c. 28 hours d. 22 hours

9. The Sun appears to move with slightly different speeds each day due to ....
   a. the elliptical orbit of Earth
   b. the tilt of Earth on its axis
   c. the circular orbit of Earth
   d. both a and b

10. If the Earth rotates clockwise on its axis, the Sun would appear to move from the .... to the ....
   a. east - west
   b. west - north
   c. east - south
   d. west - east

11. A city in the west of Egypt sees the sunrise .... another city in the east.
   a. after
   b. before
   c. at the same time as
   d. earlier than

2 Put (✓) or (✗):

1. Earth rotates counterclockwise on its axis from the east to the west. (   )
2. The solar system contains one star and eight planets. (   )
3. The Sun revolves around the Earth. (   )
4. The Earth revolves around the Sun once every 24 hours. (   )
5. The Earth orbits the Sun is an oval path. (   )
6. The cycle of seasons occurs due to the rotation of Earth around its axis. (   )
7. The Earth rotates slower than Jupiter, so the day on Jupiter is more than 24 hours. (   )
8. The angle of the tilt of the Earth on its axis is constant all year. (   )
9. Sunrise in Cairo occurs at the same time every day. (   )
10. Daytime length is determined by the tilt of the Earth on its axis only. (   )
11. The length of day and night are always equal during the whole year. (   )

Unit 4

3 Write the scientific term:

1. It is a series of events repeated in the same order. (..........)
2. It is the direction at which the Earth rotates on its vertical axis. (..........)
3. They are the paths in which planets revolve around the Sun at different speeds. (..........)
4. It is the fastest planet during its rotation on its axis. (..........)
5. It is a cycle resulted from the revolution of the Earth around the Sun. (..........)
6. It includes the Sun and eight planets revolving around it. (..........)

4 Correct the underlined words:

1. The Earth rotates clockwise on its axis. (..........)
2. The Earth moves around the Sun once every day. (..........)
3. Planets rotate on their axes at the same speed. (..........)
4. The Earth orbits the Sun in a rectangular path. (..........)
5. The Sun is located at the center of the Milky Way. (..........)
6. The Earth rotates around its axis once every 30 hours. (..........)

5 Complete the following using the words between the brackets:

(west – axis – the Sun – seasons cycle – east – 24 hours – tilt)

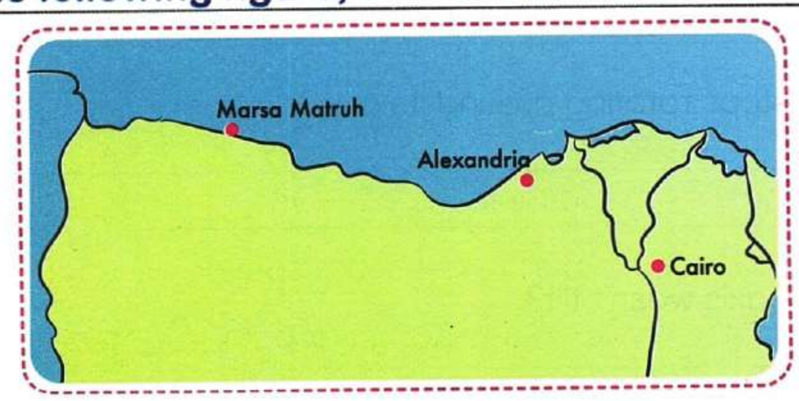
1. The Earth's revolution around the Sun causes the ....
2. The Earth is slightly .... around its axis.
3. The Earth rotates counterclockwise on its axis from the .... to the ....
4. The Earth rotates around its vertical .... every ....
5. The solar system includes .... at its center and eight planets around it.

6 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Earth's axis	a. is the center of the solar system.
2 The Sun	b. is the fastest planet rotating around its axis.
3 Jupiter	c. results from the Earth's revolution around the Sun.
4 The seasons cycle	d. is vertical and passes through the two poles of Egypt.

1 .... 2 .... 3 .... 4 ....

7 Study the following figure, then choose:



1. If the sunrise in Alexandria is at 6: 32 a.m., the sunrise in Marsa Matruh will be at .... a.m.
   a. 6 : 32   b. 6 : 35   c. 6 : 27

2. The sunset time in Alexandria and Marsa Matruh is different due to ....
   a. the tilt of Earth on its axis
   b. the elliptical orbit of Earth
   c. both a and b

3. If you are going on a trip from Alexandria eastward to Cairo, you will see the sunrise .... the sunrise in Alexandria.
   a. after   b. before   c. at the same time of

8 Give reasons for:

1. The four seasons cycle occurs.

....

....

2. The day length is different from a city to another.

....

....

3. The day on Earth is longer than the day on Jupiter.

....

....

9 What happens if:

1. The Earth stops rotating around its axis?

....

....

2. The Earth's axis wasn't tilt?

....

....

3. The Earth rotates clockwise on its axis?

....

....

4. Both Earth and Jupiter rotate on their axes at the same speed?

....

....

Lesson 3



Activity  Effects of Earth's Rotation

- Sometimes, we may not feel that we are moving, but we are.
- If you are high above the clouds and you look out the window, it can be hard to tell that you are moving, but in fact you are traveling at **hundreds of miles per hour.**



- Earth rotates at a very high speed of more than **1,600 kilometers per hour.**

• عند السفر بالطائرة، قد يكون من الصعب معرفة أنك تتحرك إلا إذا نظرت من النافذة.

• يدور كوكبنا حول محوره بسرعة كبيرة جدًا تزيد عن 1,600 كيلومتر في الساعة.



We don't feel Earth's rotation.

Because we are moving at the same speed as the Earth's rotation.

Movement of Objects in the Sky

Earth's rotation on its axis causes the apparent movement of some celstial bodies, such as:

1 Sun

- It appears to rise in the east and set in the west. **G.R**

  Because Earth rotates from the west to the east (counterclockwise).

  • تظهر الشمس أنها تشرق من الشرق وتغرب من الغرب؛ بسبب دوران الأرض حول محورها من الغرب للشرق (عكس عقارب الساعة).

2 Stars

- Stars seem to move in the night sky.
- Stars seem to rise and set, like the Sun.

  • تظهر بعض النجوم كأنها تتحرك في السماء ليلًا. • تظهر بعض النجوم كأنها تشرق وتغرب مثل الشمس.

NOTE:

- You can observe shadows of objects move throughout the day also due to Earth's rotation.

  • يمكننا ملاحظة تغيُّر موقع الظل خلال اليوم.






Activity 7 What Can Shadows Tell Us?

» The ancient Egyptians invented a shadow clock called **the sundial**.

Experiment

» In this activity, we will investigate the change in the lengths and angles of the shadows throughout the day.

Tools:


Cardstock


Compass


Clay

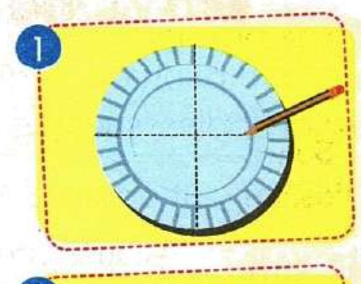

Ruler


Protractor

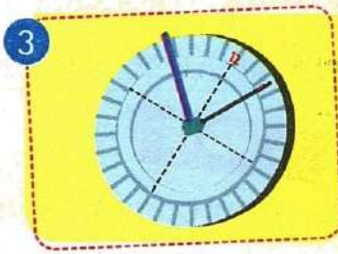

Plastic straw

Steps:

1. Find the center of the cardstock. Draw reference lines that split the cardstock vertically and horizontally. The intersection of these two lines is the center of the cardstock.
2. Use **clay** to stick the straw to the center of the cardstock.
3. Use the **compass** to face your shadow clock north.
4. Use the ruler to determine the length of the shadow every two hours.
5. Use the **protractor** to measure the angle of shadow with the horizontal line.
6. Record the lengths and angles in the data table.







Concept 2

Data table:

Time	10:00 a.m.	12:00 p.m.	2:00 p.m.
Shadow Length (cm)	18	10	17
Shadow Angle	50	90	140

Observation:

- The lengths and angles of the shadows change throughout the day.

• يتغيَّر طول الظل وزاوية الظل لنفس الجسم على مدار اليوم.

Conclusion:

- Earth's rotation around its axis affects the position of the Sun in the sky. So, the length and angle of the shadow change throughout the day.

• يُؤثِّر دوران الأرض حول محورها على موقع الشمس في السماء؛ وبالتالي يتغير طول الظل وزاوية الظل للجسم على مدار اليوم.

The factors that affect the length and angle of a shadow

1. The amount of sunlight that reaches the Earth during different seasons
2. The position of the Sun throughout the day

	In the early morning or late afternoon	At noon
Sun's Position	The Sun is low in the sky (in the east or west).	The Sun is high and above us in the sky.
Length of the Formed Shadow	An object has the longest shadow. Morning Afternoon	An object has the shortest shadow. Noon

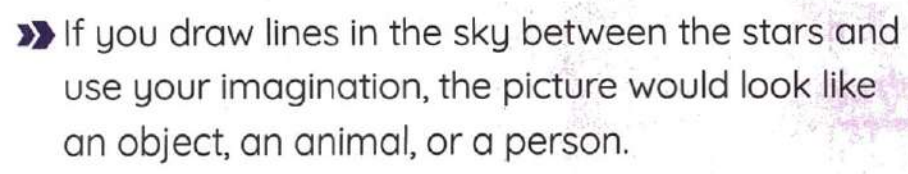
Check your understanding?

Put (✓) or (✗):

1. The apparent motion of the Sun is due to the Earth's revolution. (   )
2. An object has the longest shadow at noon. (   )







Activity 8 Constellations Visible During Different Seasons



- If you draw lines in the sky between the stars and use your imagination, the picture would look like an object, an animal, or a person.
- Some stars even form shapes in the sky called constellations.

• **إذا رسمنا خطوطًا** في السماء بين النجوم، واستخدمنا خيالنا الواسع، ستبدو الصورة وكأنها جسم أو حيوان أو شخص.

• **قد تكون** بعض النجوم أشكالًا في السماء يُطلق عليها التجمع النجمي.

Constellation

- It is a group of stars that looks like a pattern of a certain shape in the sky.

• **التجمع النجمي:** مجموعة من النجوم تُكوِّن معًا شكلًا معينًا في السماء.

Example: The Constellation Orion

- The ancient Greeks gave it this name relative to a mythical hunter.

• يُعتبر أوريون (الصياد) من أمثلة التجمعات النجمية،
وأطلق عليه اليونانيون القدماء هذا الاسم نسبة إلى صياد أسطوري.



Properties of Stars in Constellations

1. Stars are not connected to each other at all.
   النجوم غير متصلة ببعضها البعض.
2. Stars are far away from Earth.
   النجوم بعيدة جدًا عن الأرض.
3. Stars' positions don't change.
   أماكن النجوم ثابتة لا تتحرك.

Concept 2

Importance of Constellations

- Locations of constellations during the year help us determine the main four directions (north, south, east, and west).

• قد تساعدنا معرفة أماكن بعض التجمعات النجمية على تحديد الاتجاهات المختلفة مثل الشمال أو الجنوب أو الشرق أو الغرب.

Motion of Constellations

Stars seem to move across the night sky. But, in fact, the positions of the stars do not change.





Reason → Earth's rotation around its axis

You can see more different constellations in winter than in summer.





Reason → Earth's revolution around the Sun

• تبدو النجوم وكأنها تتحرك عبر السماء ليلًا، ولكن في الواقع لا تتغير مواضع النجوم؛ بسبب دوران الأرض حول محورها.

• قد تلاحظ تجمعات نجمية مختلفة في الشتاء عن الصيف؛ بسبب دوران الأرض في مسار محدد حول الشمس.



1. Every night, new stars appear from the east.
   Because the direction that the night sky faces shifts a little bit.
   • تظهر نجوم جديدة كل ليلة من الشرق؛ لأن اتجاه الأرض الذي يواجه السماء ليلًا يتغير قليلًا.

2. Some constellations still exist even though we cannot see them.
   Because they are just not visible from where we are located on Earth.
   • توجد بعض التجمعات النجمية، ولكننا لا نستطيع رؤيتها من الأرض؛ لأنها غير مرئية من مكاننا على الأرض.

3. The appearance of star patterns and constellations are associated with specific seasons.
   Because in the summer, you are looking in a different direction in space at night than during the winter during Earth's revolution around the Sun.
   • رؤية بعض التجمعات النجمية مرتبطة بفصول سنة محددة.
   • لأنك ترى تجمعات نجمية مختلفة في الفضاء ليلًا في الصيف عن التي رأيتها في الشتاء أثناء دوران الأرض حول الشمس.

Exercises on Lesson 3

1 Choose the correct answer:

1. Earth's rotation on its axis causes all the following, except ....
   a. the sunrise and sunset of the Sun
   b. the sequence of day and night
   c. the movement of shadows
   d. the sequence of seasons
2. The apparent movement of stars across the sky is due to ....
   a. Earth's revolution around the Sun
   b. Earth's rotation on its axis
   c. the moon's revolution around Earth
   d. Earth's revolution around the galaxy
3. .... depends on the movement of shadows throughout the day.
   a. Sunrise
   b. Sunset
   c. Sundial
   d. Your hand watch
4. An object is 10 cm long, so its shadow's length at noon may equal .... cm.
   a. 10
   b. 3
   c. 15
   d. 20
5. The shortest shadow of an object happens ....
   a. in the morning
   b. in the afternoon
   c. at noon
   d. at night
6. Changing the location of the Sun in the sky changes the .... of the shadow.
   a. length
   b. angle
   c. color
   d. length and angle
7. If the Sun is setting in the western part of the sky, in which direction will we find the shadow of an object?
   a. South
   b. North
   c. East
   d. West
8. At which location of the Sun would the shadow of the light post be the longest?
   a. "A" at 11 a.m.
   b. "B" at noon
   c. "C "at 2 p.m.
   d. "D" at 6 p.m.

9 .... is a group of stars that looks like a certain shape in the sky.

a. A planet
b. A constellation
c. The moon
d. The solar system

10 Constellations may only be visible during certain seasons due to the Earth's orbit around ....

a. the Sun
b. its axis
c. the moon
d. Jupiter

11 A constellation appears .... in the sky during the year.

a. at different positions
b. at the same position
c. in winter only
d. in summer only

2 Put (✓) or (✗):

1. We are moving with the same speed of Earth's rotation which is 1600 km/hr. (   )
2. Earth rotates on its axis at low speed. (   )
3. The formation of shadows is due to Earth's revolution around the Sun. (   )
4. When the Sun is low in the sky, it forms a long shadow of an object. (   )
5. The amount of sunlight that reaches the Earth is the same in winter and summer. (   )
6. The positions of stars in the night sky don't change. (   )
7. A constellation is made of a group of planets. (   )
8. Constellations have similar shapes in the sky. (   )
9. You can see the same constellations in winter and summer. (   )
10. Orion's Constellation stays in its location in the sky even if you can't see it. (   )
11. We can see constellations during the day. (   )

3 Write the scientific term:

- It is a group of stars that looks like a certain shape in the sky. (..................)

Concept 2

4 Complete the following using the words between the brackets:

(position of the Sun - east - longer - amount of sunlight - shortest - pattern)

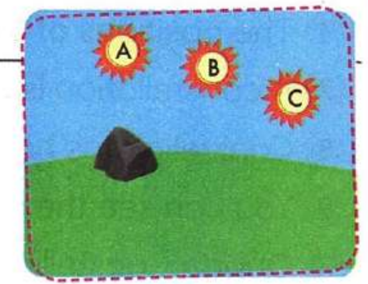
1. Your shadow at 7 p.m. is .... than your shadow at 12 p.m.
2. The length and angle of shadow depend on the .... reaching the Earth, and the .... in the sky.
3. A constellation is a group of visible stars that form a ....
4. At noon, the Sun forms the .... shadow of an object.
5. Every night, we can see stars appearing from the ....

5 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 The movement of a shadow	a. is the first time tool used by ancient Egyptians.
2 The sundial	b. causes constellations to be different in winter than in summer.
3 Earth's revolution around the Sun	c. causes the stars to appear to move across the night sky.
4 Earth's rotation around its axis	d. occurs as the Sun moves across the sky.

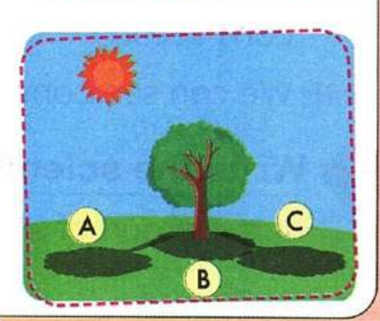
1 .... 2 .... 3 .... 4 ....

6 Study the following figures, then choose:



1. Which position of the Sun will make the longest shadow?

   a. A b. B c. C



2. What is the direction of the shadow based on the position of the Sun in the figure?

   a. A b. B c. C

7 Study the opposite figure, then put (✓) or (✗):

1. This constellation is called "Orion". ( )
2. This constellation is named after a mythical hunter by the ancient Romans. ( )
3. The stars in this constellation are very close to each other. ( )
4. This constellation is made of a group of stars. ( )

8 Give reasons for:

1. We cannot feel the high speed of Earth's rotation.

   ....

2. Your shadow's length changes throughout the day.

   ....

3. Stars seem to move across the night sky.

   ....

4. We can see different constellations across the year.

   ....

5. Every night, new stars appear from the east.

   ....

9 What happens if:

1. The Sun's position in the sky doesn't change through the day?

   ....

2. You measure the length of a tree's shadow during the morning and at noon?

   ....

Lesson 4



Activity  Constellations

Stars:



- Stars make their own light.
- Stars are made of hot gases, which make them bright.
- Some stars are larger than our Sun, while others are smaller.

• النجوم تصدر ضوءها الخاص. • تتكوَّن النجوم من غازات ساخنة تتسبَّب في توهجها.

• بعض النجوم أكبر حجمًا من الشمس، وبعضها أصغر منها.

Planets and moons:



- Planets and moons do not make their own light.

• الأقمار والكواكب لا تصدر ضوءًا.



The moon appears bright in the sky.

Because the moon reflects the light of the Sun.

• القمر يبدو مضيئًا على الرغم أنه لا يصدر ضوءًا؛ لأنه يعكس ضوء الشمس.

Constellations:



- Some constellations are always visible, and others can only be seen during specific seasons.

• بعض التجمعات النجمية تكون ظاهرة، وبعضها الآخر يرتبط ظهوره بفصول سنة محددة.



The location of constellations near the North and South Poles changes a little bit during the year.

Because stars close to the North and South Poles move slightly in the sky.

• يتغير مكان النجوم في التجمع النجمي بشكل بسيط على مدار العام

لأن النجوم القريبة من الأقطاب السماوية تتميز بحركة دورانها البسيطة.

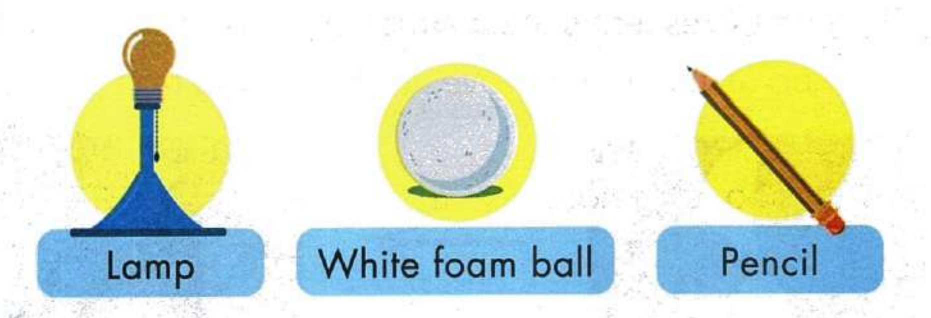


» The moon passes through **different phases** through its **revolution around the Earth**, where its apparent face changes in shape and in its lightened part size.

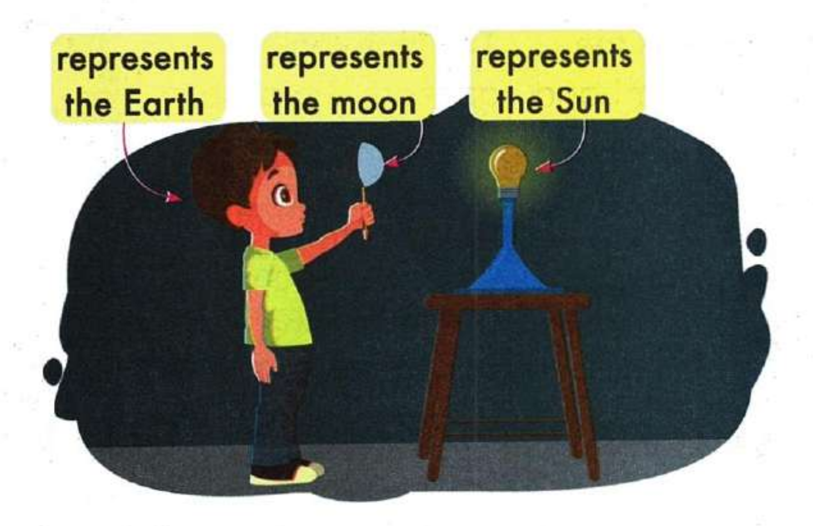
Experiment: Making the Earth-moon-sun Model

» In this activity, we will identify some phases of the moon by making an Earth-moon-sun model.

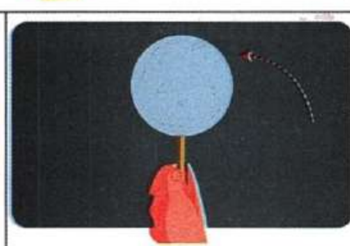
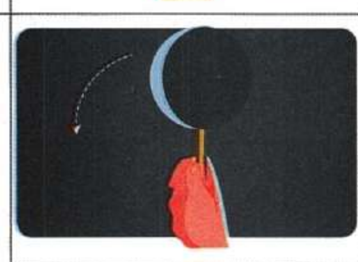
Tools:



Steps:



1. Turn on the lamp and darken the room.
2. Push the sharpened pencil into the foam ball.
3. You will hold the ball as shown in the figure.

Steps	Observations	Figures
④ Look at the foam ball.	The foam ball appears completely dark; this phase is the "New Moon".	
⑤ Turn your hand slowly about 45 degrees to the left and observe the foam ball.	The right edge of the ball will be illuminated as a "Crescent".	
Note: The Crescent should start very thin and then thicken up as the moon moves farther away from the Sun.		
⑥ Turn your hand to the left and keep your hand extended until your back faces the lamp.	The foam ball appears completely bright; this phase is called the "Full Moon".	
⑦ Turn your hand to the left and keep your hand extended until your back faces the lamp.	The left edge of the ball will be illuminated as a "Crescent".	

Conclusions:

- Moon doesn't create its own light, but it reflects the sunlight that falls on it.
- Moon phases change as the moon revolves around the Earth.

• القمر لا يصدر ضوءًا لكنه يعكس ضوء الشمس الساقط عليه. • تتغير أوجه القمر أثناء دورانه حول الأرض.

Concept 2

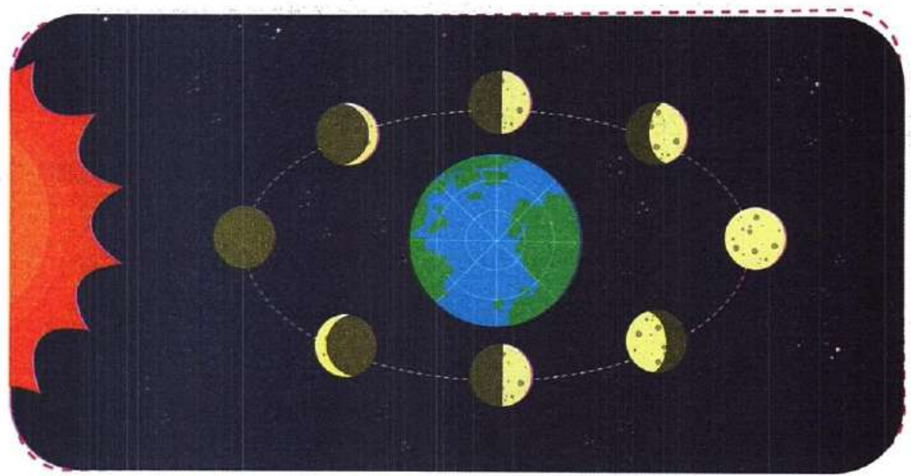
The moon phases during the lunar month "Hijri month":

Moon Phase	Description
① First Crescent	• The edge of the moon's face appears as an illuminated crescent (small and shiny), where its size increases gradually with time. • This phase is the first phase of the moon phases.
② First Quarter	• One half of the moon's face is illuminated. • The other half of the moon's face is darkened.
③ First Gibbous	• The bright illuminated ened part of the moon's face increases gradually. • The line separating the illuminated part and the darkened part appears curved.
④ Full Moon	• The apparent face of the moon that faces the Earth is fully illuminated. • This phase appears in the middle of the lunar month.
⑤ Second Gibbous	• The illuminated part of the moon's face decreases gradually. • The line separating the darkened part and the illuminated part appears curved.
⑥ Second Quarter	• One half of the moon's face is darkened. • The other half of the moon's face is illuminated.
⑦ Second Crescent	• The edge of the moon's face is an illuminated crescent.
⑧ New Moon	• The apparent face of the moon that faces the Earth is fully darkened. • This phase appears on the last day of the lunar month.

Unit 4

- The moon phases are changed during the lunar month "Hijri month".
- The cycle of the lunar phases is repeated at the beginning of each lunar month.

• تتغير أطوار القمر خلال الشهر القمري (الهجري) • تبدأ دورة القمر مع بداية كل شهر هجري (قمري).



Guidelines to Help Students

If the question says:	Moon's phase will be:
The moon appears fully illuminated. (It appears as a completely bright circle.)	Full Moon
The moon appears fully darkened.	New Moon
One half is illuminated + the other half is darkened.	First or Second Quarter
The edge of the moon's face appears illuminated. (The bright part is less than the dark one.)	First or Second Crescent
The illuminated part of the moon's face increases gradually. The bright part is greater than the dark one.	First Gibbous
The illuminated part of the moon's face decreases gradually. (The bright part is greater than the dark one.)	Second Gibbous

Concept 2

Give reasons for:

1. The moon has different phases in the night sky.
   - Due to the moon's revolution around the Earth.
   - Due to the Earth's revolution around the Sun.
2. The moon is a dark body, but we see it shiny in the sky.
   Because the moon reflects the sunlight falling on it.

What happens if...

1. Half of the moon faces the Sun?
   Half of the moon is illuminated, where First Quarter phase occurs.
2. The moon lies between the Earth and the Sun?
   The moon appears fully darkened (New Moon phase).
3. The Earth lies between the Sun and the moon?
   The moon appears fully illuminated (Full Moon phase).

Check your understanding?

» Put (✓) or (✗):

1. The moon is the center of the solar system. ( )
2. New Moon is a moon phase that appears at the end of the Hijri month. ( )
3. The moon seems illuminated to us because it reflects the sunlight. ( )
4. Moon phases change as the moon revolves around the Earth. ( )

Exercises on Lesson 4

1 Choose the correct answer:

1. .... are made of hot gases, so they seem bright.
   a. Planets b. Moons c. Stars d. Moon and Sun
2. The location of constellations in the sky across the year helps us determine the ....
   a. time b. main directions c. weather d. climate
3. The location of the constellations closer to the .... and the .... changes a little bit throughout the year.
   a. South Pole - Equator b. North Pole - Equator
   c. Equator - Earth's axis d. North Pole - South Pole
4. Which statement about stars is true?
   a. Stars are made of hot liquids.
   b. Stars in constellations are so close to us.
   c. All stars have the same size.
   d. Stars are made of hot gases.
5. the moon revolves around the Earth in .... orbit.
   a. a circular b. a straight c. an elliptical d. a rectangular
6. The moon appears as a completely bright circle at .... phase.
   a. New Moon b. Full Moon
   c. Second Quarter d. First Quarter
7. What causes the phases of the moon?
   a. Earth's revolution around the moon
   b. Earth's rotation on its axis
   c. The Sun's revolution around the moon
   d. The moon's revolution around the Earth
8. The cycle of the moon lasts about a ....
   a. day b. year c. month d. week

9 How many phases does the moon go through?

a. 9 b. 10 c. 7 d. 8

10 The moon appears completely dark in .... phase, while it appears completely illuminated in .... phase.

a. Full Moon - New Moon
b. New Moon - First Quarter
c. New Moon - Full Moon
d. Full Moon - Second Crescent

2 Put (✓) or (✗):

1. The moon and stars make their own light. ( )
2. Some constellations are always visible in the sky. ( )
3. The Sun is one of the largest stars in the universe. ( )
4. Full Moon appears in the middle of the lunar month. ( )
5. Jupiter can make its own light. ( )
6. Both the Earth and moon orbit the Sun. ( )
7. In the Full Moon phase, we can't see the moon in the sky. ( )
8. The sunlit part of the moon always changes. ( )
9. Moon phases are repeated every solar month. ( )
10. The illuminated edge has the same shape in both First Crescent and Second Crescent phases. ( )
11. New Moon phase occurs when the moon is between the Earth and the Sun. ( )
12. The moon appears bright in the sky because it reflects sunlight. ( )
13. The illuminated part of the moon in the First Gibbous phase is greater than that in the Second Gibbous phase. ( )

3 Write the scientific term:

1. They are large celestial bodies that consist of hot gases. (..................)
2. It is the time taken by the moon to complete one cycle around the Earth. (..................)
3. It is the moon phase that appears in the middle of the lunar month. (..................)

4. It is the moon phase that appears on the last day of the lunar month. (..................)

5. It is a celestial body that orbits the Earth and reflects sunlight on it. (..................)

4 Correct the underlined words:

1. In Crescent phase, only one half of the moon is illuminated. (..................)
2. Earth is considered a star. (..................)
3. The First Gibbous phase follows the First Crescent phase. (..................)
4. In the Second Quarter phase, the left side of the moon is dark. (..................)

5 Complete the following using the words between the brackets:

(beginning – reflects – hot gases – moon – Full Moon – planets)

1. Stars are made of ....
2. Both the .... and .... don't make their own light.
3. We see the moon bright in the sky because it .... the sunlight.
4. The lunar phases are repeated in the .... of each lunar month.
5. .... appears when Earth is between the Sun and the moon.

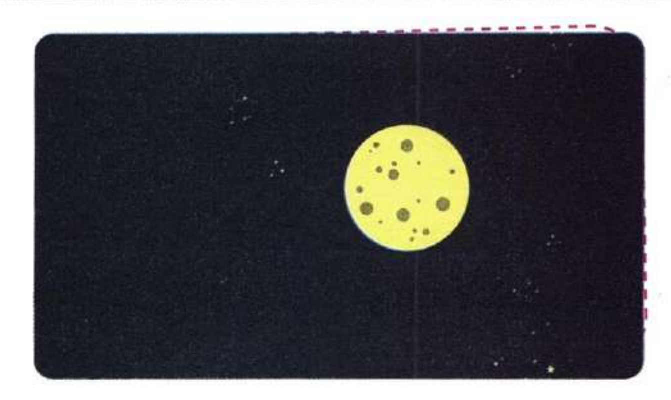
6 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 First Crescent	a. is the phase, in which you can see one half of the moon illuminated.
2 Second Quarter	b. is the first phase of the moon phases.
3 First Gibbous	c. is the phase, in which you can see more than half of the moon illuminated.

1 .... 2 .... 3 ....

Concept 2

7 Study the following figure, then put (✓) or (✗):



1. This represents the Full Moon phase. ( )
2. This phase occurs on the last day of the lunar month. ( )
3. The First Gibbous phase occurs before this moon phase. ( )
4. The Second Quarter phase occurs after this phase. ( )

8 Give reasons for:

1. The stars seem bright in the night sky.

   ....

2. The moon appears bright in the night sky.

   ....

3. The moon has different phases throughout the lunar month.

   ....

9 What happens if:

1. The sunlight doesn't fall on the moon?

   ....

2. The moon lies between the Earth and the Sun?

   ....

Lesson 5



Activity 11 What Are Stars?



» Put (✓) or (✗):

1. The Sun is the biggest star. ( )
2. Our solar system contains eight planets only. ( )


Copernicus

• Copernicus proved that the Sun is the center of the solar system.

• أثبت العالم كوبرنيكوس أن الشمس هي مركز مجموعتنا الشمسية.



The Sun

The Sun

1. The Sun is a medium-sized star.
الشمس نجم متوسط الحجم.

2. The Sun is the only star located in our solar system, while other stars are farther away.
الشمس هي النجم الوحيد الذي يقع داخل مجموعتنا الشمسية.

3. The Sun provides the Earth with heat and light, which are very important for life continuity.
تمدنا الشمس بالضوء والحرارة اللازمة لبقاء الحياة على سطح الأرض.

4. The Sun appears so bright in the sky because it is the largest object in the solar system and the closest star to Earth.
تظهر الشمس بشكل لامع في السماء؛ لأنها أكبر جسم في المجموعة الشمسية وهو النجم الأقرب للأرض.

» When you look up at the sky at night, you may be able to see thousands of stars.



They are giant spheres of superhot gases made of mostly hydrogen and helium gases.

النجوم: هي أجرام سماوية عملاقة تتكوَّن من غازات شديدة الانفجار كالهيدروجين والهيليوم.



» Stars appear bright in the sky.

Due to the burning of gases that form these stars.

• تظهر النجوم لامعة في السماء؛ بسبب التفاعلات التي تحدث بين الغازات المُكوِّنة للنجوم.

How do stars including the Sun produce light and heat energies?

» They use energy from the reactions of gases to give off heat and light energies.

تحدث كثير من التفاعلات بين الغازات داخل النجوم؛ لتنتج طاقة حرارية وضوئية.



1. The Sun seems much larger for us than the other stars.

   Because the Sun is the nearest star to Earth, while other stars are farther away.

   • تبدو لنا الشمس بحجم أكبر من باقي النجوم في السماء؛ لأن الشمس أقرب نجم لكوكب الأرض، بينما باقي النجوم بعيدة جدًّا عن كوكب الأرض.

2. There are 8 planets and more than 200 moons that revolve in fixed orbits around the Sun.

   Because the Sun has the greatest gravitational force as it is the biggest object in the solar system.

   • توجد ثمانية كواكب وحوالي 200 قمر تدور في مدارات محددة حول الشمس؛ لأن الشمس تمتلك أكبر جاذبية؛ بسبب أنها أكبر جسم متواجد في المجموعة الشمسية.

Check your understanding?

» **Put (✓) or (✗):**

1. The Sun appears to be the biggest star to us. ( )
2. Most stars are made of solid rocks. ( )

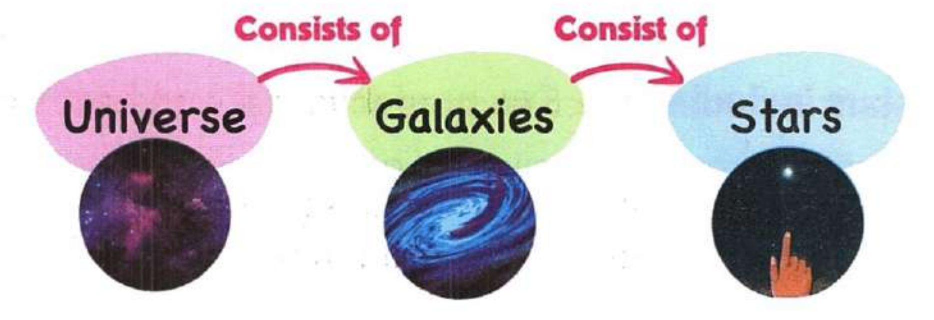



Unit 4

Activity 12 How Do We Study the Stars?



- If you look in the sky, you can see some celestial bodies with your naked eye, while you can't see others.
- Most stars appear as small light dots, so we can't differentiate between them.



Universe

It is the wide space that contains celestial objects such as galaxies, stars, planets, comets, meteors, and even hunam-made satellites like the International Space Station.... etc.

الكون: هو الفضاء الشاسع الذي يضم عددًا ضخمًا من المجرات والنجوم والكواكب والمذنبات والنيازك وأقمار صناعية من صنع الإنسان مثل محطة الفضاء الدولية وغيرها من الأجرام الأخرى.

Galaxy

It is a group of stars, planets, and gases held together by gravity.

المجرة: تجمعات كبيرة من النجوم والكواكب والغازات الأخرى مرتبطة ببعضها بواسطة الجاذبية.



G.R

Astronauts cannot be sent to study stars or other celestial bodies.

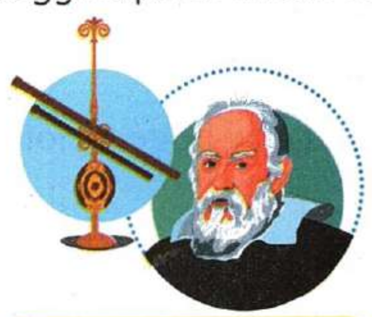
Because the universe is so big, and these celestial bodies are just too far away from Earth.

• لا يمكننا إرسال رواد الفضاء لدراسة النجوم والأجرام السماوية الأخرى؛ لأن تلك الأجسام شديدة البعد عن كوكب الأرض.

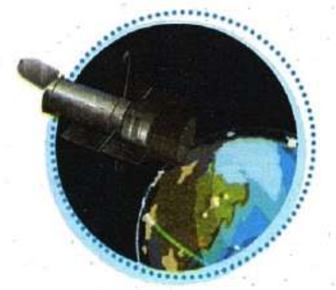
Concept 2

Using Technology to Study the Universe

» Technology helps us invent some tools, such as:



Galileo Binoculars



Hubble Telescope

Importance of binoculars and telescopes:

They help us take a closer look at more distant objects in greater details, such as:

1. The surface of the moon
2. Asteroids
3. Our neighboring planets
4. Stars in and out our galaxy

أهمية المناظير (ثنائية العدسة) والتلسكوبات:

• تساعدنا على إلقاء نظرة عن قرب على الأجسام شديدة البعد من كوكب الأرض، مثل: رؤية سطح القمر والكويكبات والكواكب المحيطة بالأرض والنجوم داخل أو خارج مجرتنا.



Some telescopes that are placed on Earth's surface can't observe very distant celestial bodies.

Due to the presence of the atmosphere that acts like a protective blanket around the Earth, as it lets some light waves to pass through, while blocking others.

• بعض التلسكوبات على سطح الأرض لا تستطيع رؤية الأجرام السماوية البعيدة، بسبب وجود الغلاف الجوي الذي يمثل طبقة حماية تحيط بكوكب الأرض، بحيث يسمح بنفاذ بعض الموجات الضوئية ويحجب الأخرى.

Check your understanding?

» Put (✓) or (X):

1. Stars are too far away to send astronauts to study. (   )
2. Humans rely on technology to see more distant objects in greater detail. (   )

Lesson 6





Activity 13 Record Evidence Like a Scientist: Day and Night

- In this concept, you have learned about the patterns of motion of different celestial bodies in the sky.
- Now, try to think like a scientist by writing your claim, evidence, and scientific explanation about one of the main points of this concept through the four steps you have learned in the first concept.

Question:



- What causes the cycle of day and night, and why do the Sun, planets, and stars appear to move across the sky?



My Claim:

- ....

....



Evidence:

- ....

....



Scientific Explanation with Reasoning:

- ....

....





Activity 14 Planetarium Director and the Stars

» Did you know that you could see stars, planets, and constellations in one place?

Planetarium

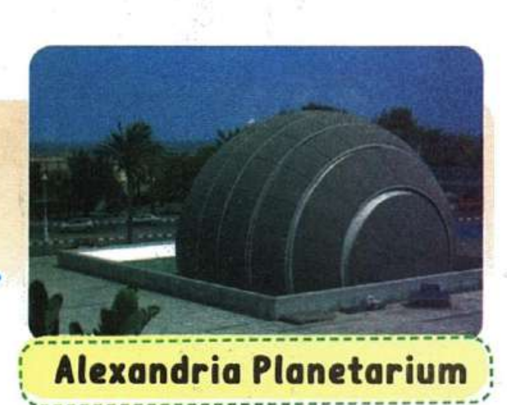
It is a place where we can see images of stars, planets, constellations, and other celestial bodies.

• هو مكان يمكنك من خلاله رؤية النجوم والكواكب والتجمعات النجمية والأجرام السماوية الأخرى.

Importance of Planetarium:

• People can learn about space from planetariums.

• أهمية القبة السماوية: تساعد الأشخاص على دراسة الفضاء.



Alexandria Planetarium

How the Planetarium Works

① **A projector** that displays images on its ceiling that looks like a **dome**.

② **Special computer programs** are used to show pictures of:

• What the sky looks like during certain times of the month or year.

• What the sky looked like many years ago.

كيفية عمل القبة السماوية:

• يوجد جهاز عرض في هذا المسرح الفضائي يعرض صُوَرًا على السقف الذي يشبه القبة.

• باستخدام برامج كمبيوتر خاصة يمكنك رؤية كيف تبدو السماء خلال أوقات معينة من الشهر أو السنة أو كيف كانت السماء في الماضي.

Planetarium Directors

» They are scientists who study the properties and behavior of celestial bodies in space, where:

- They manage a planetarium building.
- They are responsible for making an amazing, realistic show to bring outer space to Earth.



مسئولو العروض في القبة السماوية:

هم علماء يدرسون خصائص وسلوك الأجرام السماوية في الفضاء، حيث:

- يستعينون بمعرفتهم عن الفضاء لإدارة القبة السماوية.
- يتحملون أيضًا مسئولية محاكاة الفضاء الخارجي.

إنهم مسؤولون عن تقديم عرض مذهل وواقعي لجلب الفضاء الخارجي إلى الأرض.

Check your understanding?

» Put (✓) or (✗):

1. The planetarium contains pictures of stars and other celestial bodies. ( )
2. The projector of the planetarium displays images on a flat ceiling. ( )

Exercises on Lessons 5 and 6

1 Choose the correct answer:

1. The number of stars in the solar system is ....
   a. one b. eight c. nine d. two
2. The solar system includes ....
   a. eight stars, one moon, and one planet
   b. eight planets, one star, and one moon
   c. eight planets and one star d. one star and 9 planets
3. .... has the greatest gravitational force in the solar system.
   a. Jupiter b. The moon c. Earth d. The Sun
4. We can see .... at a sky night.
   a. one moon and thousands of stars
   b. the Earth and thousands of stars
   c. the Sun and many moons d. one star and one moon
5. When burning .... and .... inside the Sun, they produce heat and light.
   a. hydrogen - water b. hydrogen - helium
   c. helium - oxygen d. helium - ice
6. .... and .... are emitted from the Sun and reach Earth.
   a. Heat – electricity b. Heat – carbon
   c. Light – dust d. Heat – light
7. The planetarium has a .... -shaped ceiling.
   a. flat b. triangular c. needle d. dome
8. Some telescopes on the Earth's surface can't observe distant celestial bodies due to the presence of ....
   a. sunlight b. rocks c. atmosphere d. sound waves
9. All the following can be seen in the night sky, except ....
   a. moons b. a planetarium c. stars d. meteors

2 Put (✓) or (✗):

1. Stars are superhot gaseous spheres; most of them are helium and nitrogen. ( )
2. The Sun is necessary for the continuity of life on Earth. ( )
3. International Space Station is a satellite that appears as a dot in the night sky. ( )
4. Binoculars and telescopes make us see the moon's surface and stars in our galaxy with more details. ( )
5. The Sun is the only star in our solar system. ( )
6. The reaction between helium and hydrogen in the Sun gives off heat only. ( )
7. Astronauts can be sent to study stars because they are very distant. ( )
8. Stars, meteors, and moons appear like dots in the night sky. ( )
9. The Sun and some stars have similar temperatures. ( )
10. The International Space Station is a type of stars. ( )
11. Planetarium directors are responsible for stimulating space. ( )

3 Write the scientific term:

1. They are giant spheres of superhot gases, most of them are hydrogen and helium. (..........)
2. A group of stars, planets, and gases held together by gravity. (..........)
3. The wide space that contains celestial objects such as galaxies, stars, and planets. (..........)
4. The scientists that operate the planetarium. (..........)

5 The scientist who proved that the Sun is the center of the solar system. (..........)

6 The nearest star to Earth. (..........)

7 It is a place where people can see images about planets, stars, constellations and other celestial bodies. (..........)

4 Correct the underlined words:

1 Solar system contains less than 200 moons. (..........)

2 Sun is a large-sized star. (..........)

3 The great gravity of Earth keeps all planets in their orbits around it. (..........)

4 We can use sunglasses or binoculars to watch a passing steroid at night sky. (..........)

5 Complete the following using the words between the brackets:

(Copernicus – Binoculars – heat – hydrogen - Sun – projector – light)

1 Sun provides Earth with .... and .... that are produced due to the reaction between .... and helium.

2 .... are from the technological tools invented to see far celestial bodies.

3 .... proved that the .... is the center of the solar system.

4 In a planetarium, there's a .... that displays images of celestial bodies.

6 Cross out the odd word:

1 Moon – Galileo binocular – International Space Station – Hubble Space Telescope (..........)

2 Moon – Earth – Jupiter – Sun (..........)

7 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Universe	a. is a medium sized star.
2 Sun	b. is a group of stars, planets and gases held together due to gravity.
3 Galaxy	c. can be used to see neighboring planets of Earth.
4 Hubble Space Telescope	d. is a productive blanket around the Earth that allows some light waves to pass and blocks other.
5 Atmosphere	e. is a wide space that contains celestial bodies.

1 .... 2 .... 3 .... 4 .... 5 ....

8 Study the opposite figure then, Put (✓) or (✗):



1. The Sun is located in the center of the solar system. ( )
2. The Sun is considered a planet. ( )
3. The Sun gives off light only. ( )
4. The Sun has the biggest mass in the solar system. ( )
5. Earth is the only planet in the solar system. ( )
6. There is only one moon in the solar system. ( )

9 Study the opposite figure, then choose the correct answer:



1. The following figure represents a .... (satellite - planetarium).
2. We can see images of .... (rocks - planets) in this place.
3. The ceiling of this place has a .... (dome - flat) shape.

10 Give reasons for:

1. The Sun looks much larger to us than other stars.

....

....

2. The Sun is necessary for the continuity of life on Earth.

....

....

3. Stars appear shiny in the night sky.

....

....

4. Some telescopes on the Earth's surface cannot observe very distant celestial bodies.

....

....

11 What happens if?

- Hydrogen and helium are burned inside the Sun?

....

....

Model Exams on Concept 4.2

Model Exam 1

Question 1

(A) Choose the correct answer:

1. .... of the Earth is the imaginary line running through its North Pole and South Pole of
   a. Equator b. Orbit c. Axis d. Axle
2. The illuminated moon in the shape of a circle is called ....
   a. full moon b. gibbous c. first quarter d. first crescent
3. Apparent movement of stars across the sky is due to ....
   a. Earth's revolution around Sun b. Earth's rotation on its axis
   c. Moon's revolution around Earth d. Earth's revolution around galaxy
4. .... has the greatest gravitational force in the solar system.
   a. Jupiter b. Moon c. Earth d. Sun

(B) Write the scientific term:

A group of stars, planets and gases held together by gravity. (....................)

Question 2

(A) Put (✓) or (✗):

1. Day and night pattern occurs due to rotation of Earth around the moon. ( )
2. We see different constellations in winter than in summer due to Earth's revolution around the sun. ( )
3. Galileo binoculars help scientists to see distant objects in space with more details. ( )
4. The orbiting of Earth around Sun is an example of rotation. ( )

(B) Give a reason for:

The moon goes on different phases throughout the lunar month.

Question 3

(A) Correct the underlined word:

1. Planets rotate on their axes at <u>the same</u> speed.
2. The sun is a <u>planet</u> that can gives off light.
3. The <u>new moon</u> phase occurs at the middle of the lunar month.
4. <u>Earth</u> is the fastest rotating planet on its axis in the solar system.

(B) Give a reason for: We cannot feel the high speed of Earth's rotation.

Model Exam 2

Question 1

(A) Choose the correct answer:

1. Which statement about stars is true?
   a. Stars are made of hot liquids.
   b. Stars in constellations are so close to us.
   c. All stars have the same size. d. Stars are made of hot gases.
2. Sun always rises from the .... and sets in the ....
   a. west - east b. south - west c. east - south d. east - west
3. What causes the phases of the moon?
   a. Earth's revolution around the moon b. Earth's rotation on its axis
   c. The sun's revolution around the moon
   d. The moon's revolution around Earth
4. The shortest shadow of an object happens ....
   a. in morning b. in afternoon c. at noon d. at night

(B) Cross out the odd word:

Moon - Galileo binocular - International Space Station - Hubble Space Telescope.

Question 2

(A) Choose from column (A) what suits it in column (B):

(A)	(B)
1 Sundial	a. is the orbiting of Earth around Sun.
2 Earth's revolution	b. is the centre of the solar system
3 Sun	c. is a productive layer around the earth that allows some light waves to pass and blocks other.
4 Atmosphere	d. is the first-time piece used by ancient Egyptians.

(B) Write the scientific term:

The scientist who proved that the Sun is the centre of the solar system.

Question 3

(A) Put (✓) or (✗):

1. The amount of sunlight reaches the Earth is the same in winter and summer. ( )
2. Planets are celestial bodies composed of superhot gases. ( )
3. Constellations appear in the same position in the sky during the year. ( )
4. The illuminated edge has the same shape in both First Crescent and Second Crescent. ( )

(B) What happens when? Earth rotates on its axis.

School Book

Assess your Learning on Unit 4

1 Choose the correct answer:

1. The idea of sundial depends on ....
   a. formation of shadows
   b. rotation of an object around its axis
   c. motion of the moon
   d. falling objects under the effect of gravity
2. If an object is projected vertically upwards, so the object ....
   a. returns again to Earth under effect of gravity
   b. floats in space because there is no gravity
   c. clings because its gravity equals that of Earth
   d. moves fast towards space
3. The force which is originated between two touching surfaces and causes to slow the motion is called .... force.
   a. pushing   b. dragging   c. friction   d. pulling
4. The acting force on the moon to make it orbits the Earth is the ....
   a. Earth's gravity   b. Sun's gravity
   c. Moon's gravity   d. Mars's gravity
5. Parachute helps in ....
   a. increasing the velocity of the object falling to the ground.
   b. slowing down the velocity of the object falling to the ground
   c. decreasing the air resistance against the falling object
   d. increasing the drag to object towards the gravity.
6. Moon orbiting the Earth, and the reflection of sunlight on it, leads to formation of ....
   a. constellation   b. circular motion
   c. planets attraction   d. Moon phases
7. Planets continue revolving around the sun in fixed orbits under the effect of ....
   a. Earth's gravity   b. Sun's gravity
   c. Planets gravity   d. Moon's gravity
8. From the materials which are attracted to the magnet are ....
   a. iron and nickel   b. aluminium and copper
   c. silver and gold   d. aluminium and silver

9 The sequence of day and night is due to ....

a. revolution of the Moon around the Earth
b. revolution of the Earth around the sun
c. rotation of the Moon around its axis
d. rotation of the Earth around its axis

10 The illuminated moon in the shape of circle is called ....

a. full moon **b.** gibbous
c. first quarter **d.** first crescent

11 One of the results of the revolution of the Earth in an elliptical orbit around the Sun and the inclination of its axis is ....

a. differences in sunrise time and the sunset time, day after another
b. differences in sunrise time, day after another
c. differences in sunset time, day after another
d. stability of sunrise time and sunset time, the year around

12 Moon seems to be lighted in the sky due to ....

a. Reflection of Earth light on Moon's surface
b. Reflection of stars light on Moon's surface
c. Reflection of sun lights on Moon's surface
d. Self-lighting of Moon at night

13 Heat and light energies of the sun result from ....

a. explosion of the extremely hot gases inside the sun
b. the apparent of sun motion daily
c. revolution of Earth in an elliptical orbit around the sun
d. revolution of moon around Earth in front of the sun

14 The illumination and the shining of the stars in the sky is evidence that ....

a. they are composed of extremely hot gases
b. they are under the effect of sun gravity
c. they belong to our solar system
d. they are from the followers of the sun.

Glossary



Unit 3 – Concept 1

Lesson (1)

Complex	مُعقد	Interact	تتفاعل
Biosphere	الغلاف الحيوي	Hydrosphere	الغلاف المائي
Geosphere	الغلاف الأرضي	Atmosphere	الغلاف الجوي
Metals	معادن	Molten rocks	صخور منصهرة
Salt water	مياه مالحة	Fresh Water	مياه عذبة
Three-quarters	ثلاثة أرباع	Mixture	خليط
Weathering	التجوية	Erosion	التعرية
Ocean	محيط	Seas	بحر
Ground water	مياه جوفية	Lakes	بحيرات
Freezing	عملية التجمد	Evaporation	عملية التبخير
Recycle	يعيد تدوير	Bathing	الاستحمام
Recreation	الترفيه	Manufacturing	تصنيع

Lesson (2)

Altitude	الارتفاع	Porous rocks	الصخور المسامية
Definite channel	قناة محددة	Water cycle	دورة الماء
Clouds	سحب	Renewable resource	مصدر متجدد

Lesson (3)

Sphere	غِلاف	Ground water	المياه الجوفية
Glaciers	الأنهار الجليدية	Nutrients	عناصر غذائية
Photosynthesis	البناء الضوئي	Wetland	الأراضي الرطبة
Biome	المناطق الإحيائية	Rainforests	غابات ممطرة
Gulfs	خلجان		

Lesson (4)

Shallow areas	مياه ضحلة	Deep areas	مناطق عميقة
Coral reefs	شعاب مَرجانية	Intertidal zones	مناطق المد والجزر
Coast	ساحل	Bacteria	بكتيريا
Abyssal zones	المناطق السحيقة	Concentration	تركيز
High tide	المد	Low tide	الجزر

Lesson (5)

Still water	مياه ساكنة	Flowing water	مياه متحركة
Salamanders	السلمندر	Crayfish	جراد البحر
Water lily	زنبق الماء	Starfish	نجم البحر
Catfish	سمك السلور	Flounder fish	سمك مفلطح
Kelp	عشب البحر	Moses fish	سمك موسى

Unit 3 – Concept 2

Lesson (1)

Gold	ذهب	Silver	فضة
Aluminum	الألومنيوم	Continents	القارات
Conserve	يحافظ	Pollution	التلوث
Fishing	الصيد	Transporting goods	نقل البضائع
High dam	السد العالي	Agriculture	الزراعة
Low-lying area	منطقة منخفضة	Ponds	البرك
Swamps	المستنقعات		

Lesson (2)

Scarcity	ندرة	Poor quality	جودة سيئة
Extinction	انقراض	Limited (scarce)	محدود
Amphibians	البرمائيات	Watershed	مستجمعات المياه
Level of water	منسوب الماء	Constant source	مصدر ثابت
Dry up	تجف	Flooding	فيضان

Lesson (3)

Tributaries	الروافد	Creeks (streams)	جداول صغيرة
Upstream	المنبع	Downstream	المصب
Waste depot	مستودع نفايات	Watershed map	خريطة مستجمعات المياه

Lesson (4)

Paper	ورق	Oil products	منتجات النفط
Wool	صوف	Sustainability	الاستدامة
Preservation	الحفاظ	Harvesting	استنزاف
Overfishing	الصيد الجائر	Deforestation	إزالة الغابات
Cutting trees	قطع الأشجار	Overusing	الإفراط في
Overpopulation	الكثافة السكانية	Distribution	توزيع
undrinkable	غير صالحة للشرب	Brushing teeth	غسل الأسنان

Lesson (5)

Dirty water	مياه ملوثة	Charcoal	فحم نباتي
Cotton	قطن	Waste materials	مخلفات

Lesson (6)

Wastewater	مياه الصرف الصحي	Water cycle	دورة المياه
Purposes	استخدامات	Treatment	معالجة
Recycling	إعادة تدوير	Quality	جودة
Design	يصمم	Community needs	احتياجات المجتمع

Unit 4 – Concept 1

Lesson (1)

English	Arabic	English	Arabic
Skydive	القفز بالمظلات	Force	القوة
Gravity	الجاذبية	Center	مركز
Planets	الكواكب	Revolve	تدور
Orbits	مدارات	Slide	تنزلق
Float	تطفو	Mass	الكتلة
Distance	مسافة	Crash	يتصادم

Lesson (2)

English	Arabic	English	Arabic
Motion	الحركة	Invisible	غير مرئية
Force	القوة	Attraction	الجذب
Pull	السحب	Repulsion	التنافر
Push	الدفع	Magnet	مغناطيس
Magnetism	المغناطيسية	Friction	احتكاك
Astronauts	رواد الفضاء	Wind	رياح

Lesson (3)

English	Arabic	English	Arabic
Tape	شريط لاصق	Scissors	مقص
Protractor	منقلة	String	خيط (شريط)
Suspend	يعلق	Horizontal	أفقي
Angle	زاوية	Trail	محاولة

Lesson (4)

English	Arabic	English	Arabic
Iron	الحديد	Air resistance	مقاومة الهواء
Nickel	النيكل	Opposite	عكس
Cobalt	الكوبالت	Invisible	غير مرئي
Balance	الميزان	Feather	ريشة
Volumes	الحجم	Speed	السرعة
Hammer	المطرقة (الشاكوش)	Height	الارتفاع

Lesson (5)

English	Arabic	English	Arabic
Path	مسار	Orbit	مدار
Ellipse = oval	بيضاوي	Solar system	المجموعة الشمسية

Unit 4 – Concept 2

Lesson (1)

English	Arabic	English	Arabic
Stars	نجوم	Shadow	ظل
Cycle	دورة	Rotation	دوران
Spins = rotate	يدور	Phenomenon	ظاهرة

Glossary

Regular	منتظم	Imaginary	تخيلي
North pole	القطب الشمالي	South pole	القطب الجنوبي
Lesson (2)			
Center of the Earth	مركز الأرض	Counterclockwise	عكس عقارب الساعة
Vertical axis	محور رأسي	Tilted	مائل
Elliptical orbits	مدارات بيضاوية	Slightly	قليلا
Sunrise	شروق الشمس	Sunset	غروب الشمس
Length of day	طوال اليوم		
Lesson (3)			
Rise	تشرق	Set	تغرب
Cardstock	ورق مقوى	Straw	شفاطة بلاستيكية
Clay	صلصال	Compass	بوصلة
Constellations	تجمع نجمي	Thousands	آلاف
Mythical hunter	صياد أسطوري	Straw	شفاطة بلاستيكية
Clay	صلصال	Compass	بوصلة
Shifts	تتحرك		
Lesson (4)			
Bright	تتوهج	Reflect	تعكس
Seasons	فصول	Polaris	النجم القطبي
Hijri month	شهر هجري	Lunar month	الشهر القمري
First crescent	هلال أول	Second crescent	هلال ثانٍ
First quarter	تربيع أول	Second quarter	تربيع ثانٍ
First gibbous	أحدب أول	Second gibbous	أحدب ثانٍ
Full moon	البدر	New moon	محاق
Illuminated	مضيء	Darkened	مظلم
Lesson (5)			
Giant	عملاقة	Superhot gases	شديدة الانفجار
Hydrogen	غاز الهيدروجين	Helium	غاز الهيليوم
Life continuity	استمرارية الحياة	Proved	أثبت
Matter	المادة	Universe	الكون
Celestial objects	أجرام سماوية	Galaxy	مجرة
Binoculars	منظار	Telescopes	تليسكوب
Asteroids	كويكبات	Protective blanket	طبقة حماية
Lesson (6)			
Planetarium	القبة السماوية	Projector	جهاز عرض
Dome	قبة	Building	مبانٍ



سلسلة كتب الأستاذ

SCIENCE

Revision Book

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Second Term

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Concept  Biosphere and Hydrosphere Interactions

1 Summary of Concept 1



Earth's Systems

- Scientists divided the Earth into four main systems (spheres).

1 Biosphere:

- It is the system that includes all living organisms on Earth.

Examples:

- Humans
- Animals
- Plants
- Birds
- Fish
- Insects
- Microorganisms



The word "bio" means "life".

2 Atmosphere:

- It is the system that includes all the gases that surround the Earth.

Examples:

- Oxygen gas
- Carbon dioxide gas
- Water vapor
- Nitrogen gas

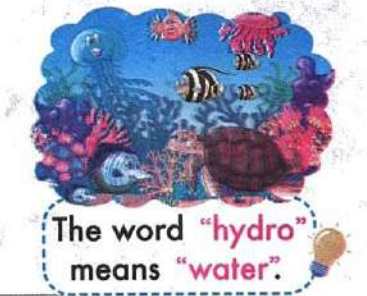
The word "atmos" means "vapor".

3 Hydrosphere:

- It is the system that includes all of the water on, under, and above the Earth.

Examples:

- Oceans
- Seas
- Rivers
- Groundwater
- Glaciers



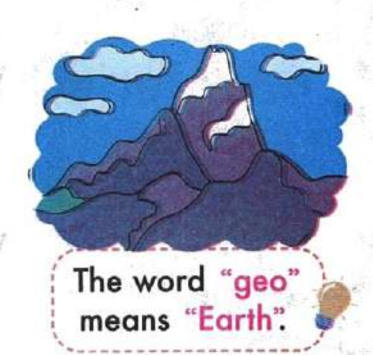
The word "hydro" means "water".

4 Geosphere:

- It is the system that includes rocks, sand, soil and minerals.

Examples:

- Rocks, sand, and soil on Earth
- Molten rocks and minerals inside Earth
- Landforms (mountains – canyons – valleys – dunes)



The word "geo" means "Earth".

Biome

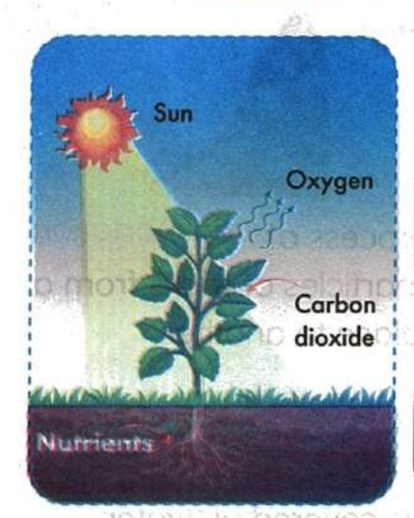


It is a large area of the world that has similar soil, climate, animals, and plants (wildlife).

Examples:

- Deserts
- Forests
- Rainforests
- Grasslands
- Wetlands

Earth's Systems Interactions



During Photosynthesis

Geosphere interacting with atmosphere:

Plants take in carbon dioxide from the air.

Atmosphere interacting with geosphere:

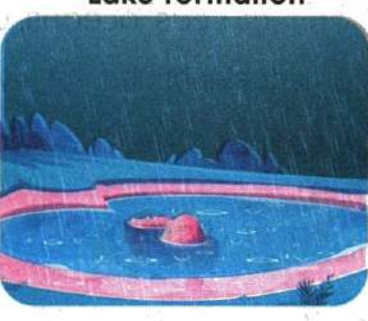
Plants take nutrients from the soil.

Hydrosphere interacting with geosphere:

Erosion of rocks by water



Lake formation



Biosphere interacting with hydrosphere:



Uses of water

- Transportation
- Manufacturing
- Traveling
- Cleaning
- Bathing
- Recreation

Water Impacts

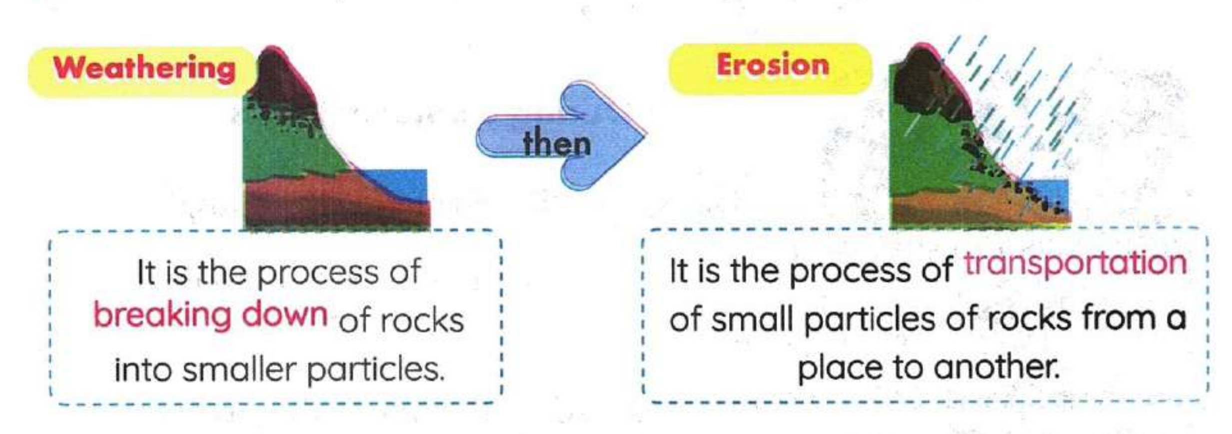



1 How do living organisms use water?

» All living organisms need water to drink, grow, and survive.

2 How does water affect nonliving things?

» Water has an impact on the Earth's surface through two processes:

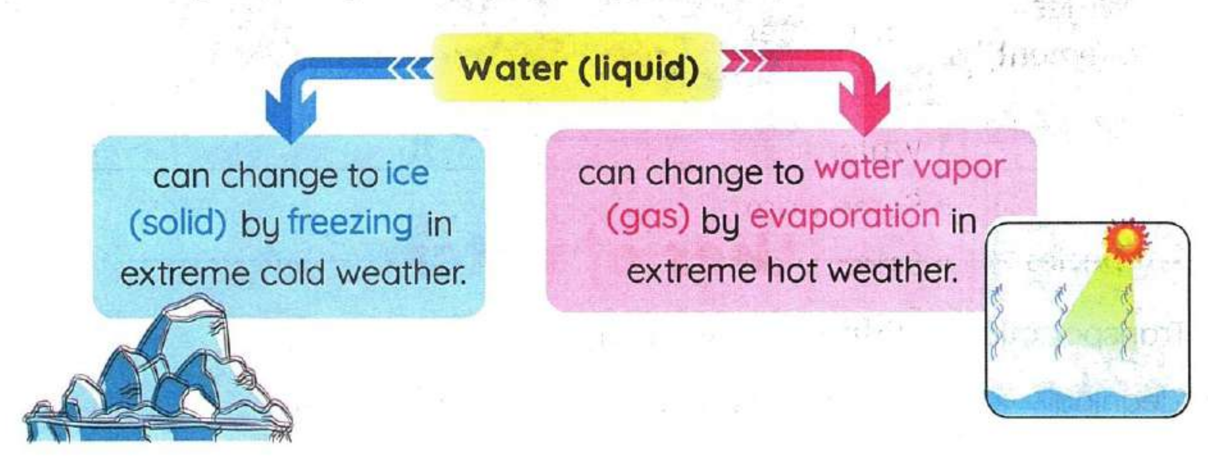


Weathering: It is the process of breaking down of rocks into smaller particles.

Erosion: It is the process of transportation of small particles of rocks from a place to another.

The Amount of Water on Earth

- Because nearly three-quarters (71%) of the Earth is covered by water.
- Salt water forms about 96.5% of the water on Earth.
- Fresh water forms 3.5% of the water on Earth.
- Water is everywhere, in lakes, rivers, seas, oceans, and underground.
- The total amount of water on Earth does not change, even if its state changes.
- We can recycle water, but we cannot make new water.

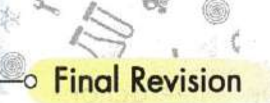


Bodies of Water

Body of Water	Definition
Lake Most lakes contain fresh water Some lakes contain salt water	It is a body of water that is surrounded by land.
River (Fresh water)	It is a body of water that flows from an area of **high altitude** to an area of **lower altitude** in a definite channel.
Groundwater (Fresh water)	It is the water that lies under the Earth's surface and has been absorbed into Earth through a layer of porous rocks.
Oceans and Seas (Salt water)	They are very large bodies of water that always contain salt water.

Species in Aquatic Ecosystems

P.O.C	Ponds	Streams	Oceans and Seas
Type of Water	Fresh water	Fresh water	Salt water
Water Movement	Still water	Running water (Cool and flows fast)	Constantly moving in the form of waves
Species	• Water lilies • Some worms • Salamanders • Frogs	• Catfish • Crayfish	• Kelps • Dolphins • Starfish • Flounder fish (Moses fish)



Aquatic Ecosystems

- Aquatic ecosystems include saltwater ecosystems and freshwater ecosystems.

1 Saltwater Ecosystems

Shallow Areas

- These areas contain coral reefs and intertidal zones.

• Intertidal Zone

It is the area along the coast that disappears underwater at the high tide and appears at the low tide.

Deep Areas

- These areas are called abyssal zones.

• Abyssal Zones

They are very deep areas in oceans where sunlight cannot reach them.

2 Freshwater Ecosystems

Still Water (Ponds and Lakes)

- In many ponds and lakes, the water is present all year.
- Some other ponds and lakes dry up in the hot summer months.

Flowing Water (Streams and rivers)

- Streams are small bodies of flowing water.
- Many different plants and animals live in moving water.

Salt Lakes	Fresh Lakes
• Lake Bardawil in Egypt • Lake Assal in Djibouti: – It has high concentration of natural salts. – Fish can't live in it. – Few plants can grow there. – Many bacteria live in it.	• Lake Nasser in Egypt

2 Definitions of Concept 1

Term	Definition
Earth	It is the complex system that includes living organisms and nonliving things that interact with each other.
Geosphere	It is the system of the Earth that includes rocks, sand, and soil.
Atmosphere	It is the system that consists of a mixture of gases surrounding the Earth, such as oxygen, nitrogen, and carbon dioxide.
Biosphere	It's a system that includes all living organisms, such as microorganisms, plants, animals, and humans.
Hydrosphere	It's the system that includes all water on Earth.
Weathering	It's the breakdown of rocks into smaller particles.
Erosion	It is the process of transportation of small particles of rocks to another place by water or wind.
Oceans and Seas	They are very large bodies of water that contain salt water.
Lake	It is a body of water that is surrounded by land.
River	It is a body of water that contains fresh water and it always flows from a high-altitude area to a lower altitude one.
Groundwater	It is the water that lies beneath (under) the Earth's surface and is stored in the cracks and spaces between underground rocks.
Biome	It is a large area of the world that has similar soil, climate, animals, and plants (wildlife).
Intertidal zone	It is the area along the coast that disappears underwater at the high tide and appears at the low tide.
Abyssal zones	They are very deep and dark areas in oceans where sunlight cannot reach them.
Salt water	It is a type of water which forms about 96.5% of water on Earth.
Fresh water	It is a type of water which forms 3.5 % of water on Earth.

3 Give Reasons for... Concept 1

1. Water is important for all living organisms.
   - Because living organisms need water to drink and grow, some animals and plants also live in water.
2. Water affects nonliving things, such as rocks.
   - Because water causes weathering and erosion of rocks.
3. Plants are among the renewable resources on Earth.
   - Because plants can be planted from seeds that grow up, they form new plants.
4. Our planet looks like a blue marble from the space.
   - Because nearly three-quarters of the Earth's surface is covered with water.
5. The total amount of water on Earth does not change.
   - Due to the occurrence of the water cycle, as water evaporates into water vapor in the air, it condensates in the form of clouds, and then falls in the form of rain.
6. Scientists name each of the four Earth's systems using the word "sphere".
   - Because the shape of Earth is very close to a sphere.
7. The absorption of nutrients from the soil by plants shows an interaction between two Earth's systems.
   - Because plants belong to the biosphere, and they absorb nutrients from the soil, which belongs to the geosphere.
8. Respiration process in humans is one of the examples for interactions between two Earth's systems.
   - Because humans belong to the biosphere, and they take oxygen and release carbon dioxide during respiration from the atmosphere.
9. Plants cannot grow in abyssal zones.
   - Because the abyssal zones are very deep, so sunlight can't reach them.
10. Sea water differs from ponds' water.
    - Because sea water is moving and salty water, while ponds' water is still and fresh water.

4 What Happens if...? Concept 1

1. High tide occurs (concerning the intertidal zone)?
   - Intertidal zones will disappear.
2. Low tide occurs (concerning the intertidal zone)?
   - Intertidal zones will appear.
3. Plants are transferred to abyssal zones.
   - They will die due to the absence of sunlight.

5 Revision on Concept 1

1 Choose the correct answer:

1. All the following are components of the atmosphere, except ....
   a. oxygen b. nitrogen c. metals d. water vapor
2. Rocks are broken down into smaller particles during .... process.
   a. photosynthesis b. weathering c. erosion d. respiration
3. The basic liquid matter that is necessary for humans, animals, and plants is ....
   a. milk b. water c. oil d. alcohol
4. Water covers nearly .... of the Earth's surface.
   a. $\frac{1}{2}$ b. $\frac{3}{4}$ c. $\frac{1}{5}$ d. $\frac{1}{4}$
5. Water is used in all the following purposes, except ....
   a. recreation b. burning c. bathing d. manufacturing
6. .... belong to the geosphere.
   a. Plants b. Rocks c. Gases d. Bodies of water
7. .... is a body of water that is surrounded by land.
   a. A lake b. An estuary c. A river d. An ocean
8. Weathering of rocks by water represents an interaction between the .... and the .... systems.
   a. biosphere - hydrosphere b. hydrosphere - geosphere
   c. hydrosphere - atmosphere d. atmosphere - geosphere
9. Scientists classified the Earth into .... spheres.
   a. three b. four c. two d. eight
10. All the following are the components of the hydrosphere, except ....
    a. rivers b. groundwater c. grass d. lakes
11. Coral reefs live in ....
    a. frozen water b. abyssal areas
    c. fresh water d. shallow areas

12 Crayfish can live in ....

a. lakes b. oceans c. streams d. ponds

13 All the following are resources of fresh water, except ....

a. groundwater b. rivers c. seas d. streams

14 Which of the following is considered an interaction between the biosphere and the atmosphere?

a. Respiration of humans
b. Weathering of rocks
c. Water cycle
d. Lake formation

15 Waterlilies grow in a body of wtaer whose water is .... and ....

a. still - salt
b. still - fresh
c. running - fresh
d. running - salt

16 .... contain(s) salt water.

a. Lake Nasser b. Nile River c. Lake Assal d. Streams

17 .... are deep areas that sunlight can't reach them.

a. Intertidal zones b. Streams c. Abyssal zones d. Seashores

18 All the following species live in fresh water, except ....

a. frogs b. catfish c. crayfish d. starfish

2 Put (✓) or (✗):

1 A lake is land surrounded by water. ( )

2 Salamanders can survive in ponds because the water is fresh and fast. ( )

3 Streams are cold and slow-flowing bodies of water. ( )

4 Water on Earth is divided into fresh water and salt water. ( )

5 Scientists classify the Earth into three main systems. ( )

6 There are no living organisms can live in the hydrosphere. ( )

7 A river always flows from an area of low place to an area with higher place. ( )

8 Oceans and seas are large bodies of water that contain salt water. ( )

9. Fish in the sea represent an interaction between the biosphere and the hydrosphere. ( )
10. The salt concentration in Lake Bardawil is higher than in Lake Assal. ( )
11. Abyssal zones are darker than shallow areas. ( )
12. Kelps live in oceans, while water lilies live in ponds. ( )
13. The hydrosphere includes all water on Earth's surface only. ( )
14. Fresh water in rivers represents less than 3.5 % of all the water on Earth's surface. ( )

3 Write the scientific term:

1. It is one of the Earth's systems that includes gases that surround the Earth. (..................)
2. It is the system that includes humans, animals, and plants on Earth. (..................)
3. It is the Earth's system that contains mountains, rocks, soil, and sand. (..................)
4. It is the Earth's system that contains salt and fresh bodies of water. (..................)
5. It is a large body of water that contains salt water. (..................)
6. It is a zone along the coast that disappears underwater at high tide and appears during low tide. (..................)
7. It is a large area characterized by a specific climate and wildlife. (..................)
8. It is the type of water that forms about 96.5 % of the Earth's surface. (..................)
9. It is the process of breaking rocks into smaller particles by water or wind. (..................)
10. It is the process of transportation of weathered rocks from a place to another. (..................)
11. It is the water that lies beneath the Earth's surface. (..................)

4 Correct the underlined words:

1. The oxygen in the air is part of the <u>geosphere</u> (..................)
2. Some <u>fish</u> can live in Lake Assal. (..................)
3. Erosion by <u>water</u> is an interaction between the geosphere and the atmosphere. (..................)
4. When water <u>freezes</u> it changes into water vapor. (..................)
5. Rivers and most lakes contain <u>salt</u> water. (..................)
6. Rain water is part of the <u>biosphere</u> (..................)
7. <u>Shallow</u> areas are called abyssal zones. (..................)
8. Some ponds and lakes may dry up in the <u>winter</u> months. (..................)

5 Complete the following using the words between the brackets:

A (flounder fish – atmosphere – dolphins – hydrosphere – Frogs)

1. Both .... and .... live in a large saltwater ecosystem.
2. .... live in ponds and this represents an interaction between the .... and the biosphere.
3. There's is an interaction between the biosphere and the .... when plants release oxygen gas.

B (summer – more – condensates – biosphere – hydrosphere – evaporates – less)

1. There is .... fresh water than salt water on Earth.
2. Lake formation is an example of the interaction between the geosphere and the ....
3. Living organisms that live in some lakes may suffer in the .... months.
4. When a hawk eats a snake, this represents an interaction in the .... system.
5. In the water cycle, water ...., then .... to fall in the form of rain.

6 Cross out the odd word:

1. Hydrosphere – Biosphere – Atmosphere – Erosion (..................)
2. Sand – Human – Rocks – Mountains (..................)
3. Oxygen – Rocks – Carbon dioxide – Nitrogen (..................)
4. Deserts – Grassland – Rainforests – Space (..................)
5. Red Sea – Lake Assal – Nile River – Lake Bardawel (..................)
6. Water lilies – Salamanders – Frogs – Kelps (..................)

7 Choose from column (A) what suits it in column (B):

A

Column (A)	Column (B)
1 The mixture of gases	a. belong to the hydrosphere.
2 Salt water and fresh water	b. are components of the geosphere.
3 People, animals, and plants	c. is considered as the atmosphere
4 Molten rocks	d. belong to the biosphere.

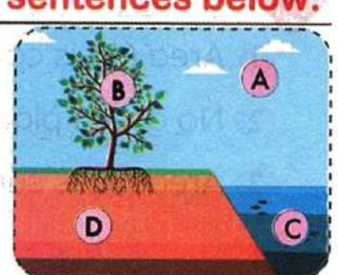
1 .... 2 .... 3 .... 4 ....

B

Column (A)	Column (B)
1 The word "geo" refers to	a. water.
2 The word "hydro" refers to	b. Earth.
3 The word "atmo" refers to	c. life.
4 The word "bio" refers to	d. vapor.

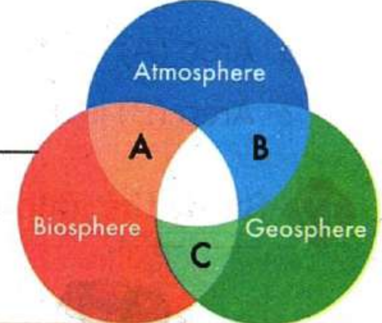


8 Study the following figure, then complete the sentences below:



1. Letter (..........) represents the geosphere.
2. Letter (..........) represents the biosphere.
3. Letter (..........) represents the atmosphere.
4. Letter (..........) represents the hydrosphere.

9 Study the following figure, then answer the questions below:



Put (✓) in front of the area that shows the interaction between the Earth's spheres:

	Area "A"	Area "B"	Area "C"
1. A rabbit digs a burrow in the soil.			
2. A volcano erupts and emits carbon dioxide into the air.			
3. A bean plant releases oxygen gas in the photosynthesis process.			
4. A giraffe breathes in oxygen gas.			

10 Study the following chart of salt water and fresh water distribution on Earth, then choose the correct answer:



1. Area (A) represents .... (fresh water – salt water)
2. A sea is part of .... (area (A) – area (B))



3. Both areas (A) and (B) belong to the ....(geosphere – hydrosphere)



4. When a polar bear hunts a seal on ice, this is an interaction between area (A) and the .... (atmosphere – biosphere)

11 Study the following figure of an ocean, then put (✓) or (✗):

1. Area (A) is called the abyssal zone. ( )
2. No green plants can survive in area (B). ( )
3. Area (A) is submerged with water at low tides. ( )
4. Area (B) doesn't receive any sunlight. ( )
5. Area (A) is warmer than area (B). ( )
6. Area (B) is a shallow area. ( )

12 Study the following figures, then complete the sentences below:

Figure (A)	Figure (B)	Figure (C)	Figure (D)

1. Figure (.........) is a plant that can survive only in still water.
2. Figure (.........) can survive only in running water.
3. Figure (.........) is an animal that can survive in ponds.
4. Figure (.........) is found in the Pacific Ocean.
5. Figures (.........) and (.........) are found in the same habitat.

13 Give reasons for:

1. Water has an impact on the rocks on the Earth's surface.

....

....

2. Human respiration is considered an interaction between two of the Earth's systems.

....

....

3 Most of the water on Earth can't be used for drinking.

....

....

4 Both the hydrosphere and atmosphere are important for plants to make their food.

....

....

5 No plants can grow in abyssal zones.

....

....

6 There are no aquatic organisms that can survive in Lake Assal.

....

....

7 Frogs and catfish can't live in the same habitat.

....

....

14 What happens if:

1 The hydrosphere on Earth is absent?

....

....

2 Some catfish are transferred from a stream to a salty lake?

....

....

Concept 2 Water as a Valuable Natural Resource

1 Summary of Concept 2

- There are many natural resources on Earth, such as water, plants, and metals.
- Most of the water on Earth is salt water.
- We must conserve fresh water and protect it from pollution.

Sources of Water

Salt water	Fresh water		Mixture of salt and fresh water
• Oceans	• Rivers	• Streams	• Estuary
• Seas	• Glaciers	• Groundwater	
• Some lakes	• Wetlands	• Most lakes	

Uses of Water

» In Egypt, water can be used in many purposes, such as:

- Generating electricity (in Aswan High Dam)
- Agriculture

» Around the world, many people work on the water by:

- Fishing
- Transporting goods

Risks that threaten fresh water

1 Scarcity of fresh water



The scarcity of fresh water threatens the life of living beings.

2 Poor quality of fresh water

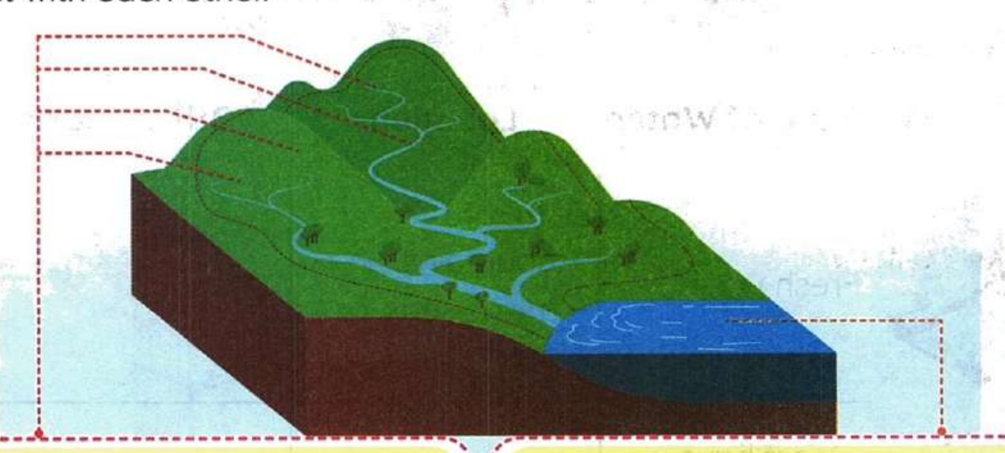


The poor quality of fresh water leads to the death or extinction of some living organisms.

Bodies of Water

Body of Water	Type of Water	Location	Other Information
Rivers	Fresh water	• Start in: mountains. • End in: seas, or larger rivers.	
Lakes	• Most have fresh water. • Some have salt water.	When water is collected in low-lying areas.	A lake is a body of water surrounded by land.
Wetlands	Fresh water	A land that is partially covered with water	• Swamps (marches) • Ponds (bogs)
Estuaries	A mixture of fresh water and salt water	Where a river meets the ocean or sea	Estuaries are homes to thousands of plants and animals.
Groundwater	Fresh water	It is the water stored in the cracks and spaces of underground rocks.	
Oceans	Salt water	They are large water bodies that surround the continents.	• All oceans are connected to each other. • The ocean's floor has mountains, plains, and plateaus.

- Watershed maps can help scientists understand how bodies of water interact with each other.

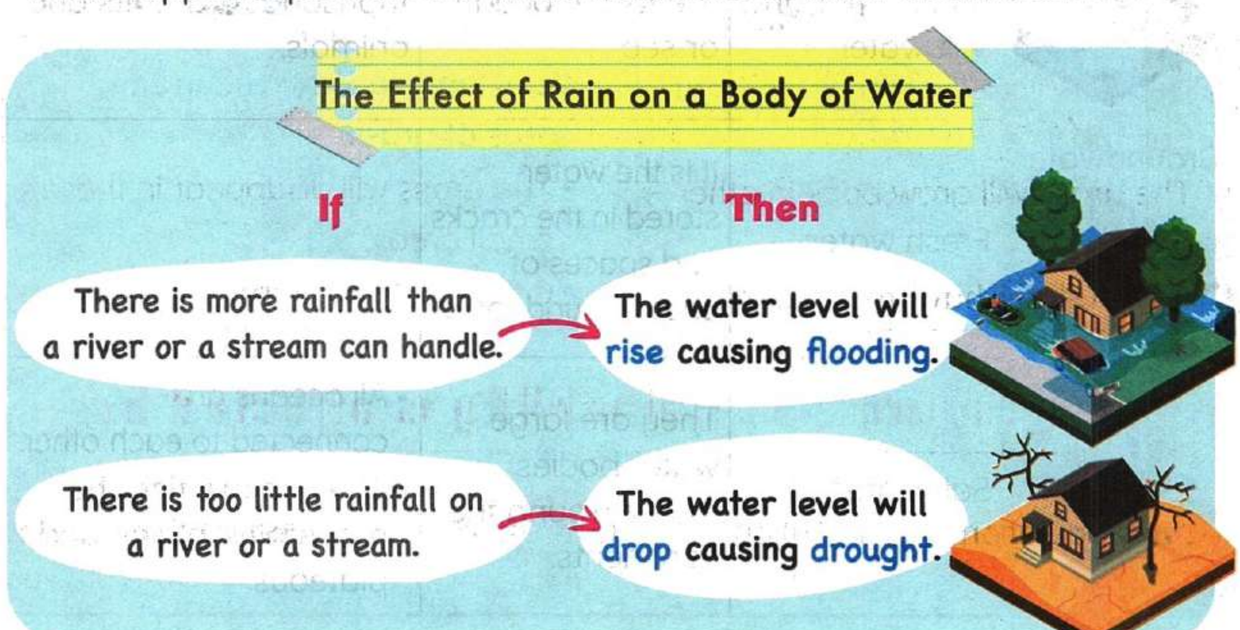


Tributaries:
They are small bodies of water, such as small creeks or streams, that flow into larger rivers.

Watershed:
It is an area of land where all the water from different sources flows towards a common location.



- Rivers start **upstream** and end **downstream**.
- What happens upstream will affect the bodies of water downstream.





1 Preservation of resources

- It means restricting access to or use of natural resources.

Examples of Resources Preservation

1. **Ras Mohammed Protectorate** (In South Sinai)
2. **Wadi Al-Hitan Protectorate** (In Fayom)

Examples of Harvesting (Depleting) Resources

1. **Overfishing**
2. **Overusing groundwater**



2 Sustainability

- It means using resources in a way that does not negatively affect the future supply of these resources.



Sustainable Situation

Cows are placed in one large area of grass.

- The grass will grow back in other areas.
- Cows will still have more food.



Unsustainable Situation

Cows are placed in many small areas of grass.

- The grass will disappear in these small areas.
- Cows will be hungry.

The resources sustainability is affected by:

- Overpopulation
- Pollution
- Overusing of resources
- Unequal distribution of resources

Recycling Water



- Solar energy **drives the water** cycle in nature.
- Humans can **recycle wastewater** and reuse it in many purposes.

Wastewater:

It is the water **that has already** been used in homes and different industries.

Recycling water:

It's the process **of removing** waste materials from water.

Wastewater engineers

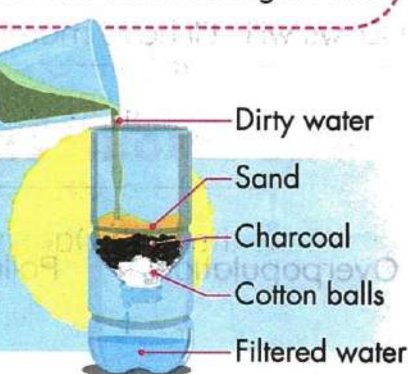
- They are **special kinds of** scientists that work in water treatment plants, such as **Bahr Al-Baqar** wastewater treatment plant in Egypt.

The role of wastewater engineers in recycling wastewater:

1. They **decide where to** build water treatment facilities.
2. They **observe and check** each step in the process.
3. They check **the water quality** and the amount of pollutants in the water.
4. They test **the treated water** to make sure it is safe to use.
5. They **design ways to protect** a community from floods.
6. They **calculate the amount** of drinking water that the community needs.

Filter model:

It helps us **remove harmful** materials from the polluted water.



2 Definitions of Concept 2

Water	It is the basic liquid matter that all living organisms need to survive.
Watershed	It is an area of land where all the water from different sources flow towards a common location.
Tributaries	They are small bodies of water, such as small creeks or streams that flow into a bigger river.
Wetland	It is a land area that is partially covered with water.
Dam	It is a building established across a river to control the flow of water.
Preservation	It means restricting access to or use of natural resources.
Sustainability	It means using resources in a way that does not negatively affect the future supply of these resources.
Wastewater	It is the water that has already been used in homes and different industries.
Wastewater engineers	They are scientists who work in water treatment plants.
Recycling water	It's the process of removing waste materials from water.

3 Give Reasons for... Concept 2

1 Most of the water existing in the Earth's hydrosphere is undrinkable.

- Because most of the water on the Earth's surface is salt water.

2 Aswan High Dam has a great importance for Egyptians.

- Because the High Dam is used to generate electricity.

3 We should conserve fresh water.

- Because all living organisms need fresh water to survive.

4. It is preferable to turn off the faucet while brushing your teeth.
   - Because this helps in conserving water.
5. Water in an estuary is a mixture of salt water and fresh water.
   - Because it is formed when the fresh water of a river meets the salt water of an ocean or a sea.
6. The poor quality of water has a dangerous effect on all living organisms.
   - Because the poor quality of water leads to:
     Death or extinction of some living organisms.
7. Watershed maps are important.
   - Because watershed maps help scientists understand how bodies of water interact with each other.
8. Farms near a river may cause water pollution.
   - Because the waste will be carried by the river to downstream areas.
9. There are many things which affect the sustainability of resources.
   - Because resources sustainability is affected by overpopulation, pollution or unequal distribution of resources.
10. Placing cows in a big area of grass is a sustainable situation.
    - Because the grass will grow back in other areas, so the cows will still have more food.
11. Placing cows in many small areas of grass is an unsustainable situation.
    - Because the cows will eat all the grass before the new grass grows back, which causes the grass to disappear in these areas; the cows will starve.
12. Protected areas are established in some places.
    - To protect natural resources from being harvested.
13. Humans create many methods to recycle waste water.
    - To reuse water for many purposes.
14. Wastewater engineers test the treated water before the water is released in rivers.
    - To make sure that the water is safe.

4 What Happens if...? Concept 2

1. The water of a river meets the water of a sea?
   - An estuary is formed.
2. We don't conserve fresh water?
   - We can't find fresh water to drink.
3. Water is collected in a low-lying area?
   - A lake may be formed.
4. There is rainfall more than a river can handle?
   - The water level will rise causing flooding.
5. The rate of rainfall on a river is too little?
   - The water level will drop causing drought.
6. A factory is established near the upstream of a river (concerning the downstream of the river)?
   - The waste of the factory will be carried by the water to downstream areas.
7. A factory is established near the downstream of a river (concerning the upstream of the river)?
   - The upstream area will not be affected by the waste of the factory.
8. People use water from wells at a faster rate than it is replaced by rain?
   - The water of wells may dry up.
9. Trees are cut down at a faster rate to get wood for cooking?
   - It may lead to deforestation.
10. Cows are placed in a big area of grass?
    - The grass will grow back in other areas, so the cows will still have enough food.
11. Dirty water passes through a filter water model?
    - The filter will remove most dirt from the polluted water.

5 Revision on Concept 2

1 Choose the correct answer:

1. .... are formed when water is collected in low-lying areas.
   a. Estuaries b. Oceans c. Lakes d. Rivers
2. .... is formed when the water of a river meets the water of a sea.
   a. An estuary b. A lake c. An ocean d. A wetland
3. The amount of salt water on Earth is .... the amount of fresh water.
   a. larger than b. smaller than c. equal to d. half
4. .... include both swamps and ponds.
   a. Seas b. Rivers c. Lakes d. Wetlands
5. The .... of fresh water may cause the extinction of some amphibians.
   a. conservation b. poor quality c. preservation d. high quality
6. When a stream receives too little rainfall, ... may occur to this stream.
   a. drought b. flooding c. pollution d. overflowing
7. The area of land where water flows towards a common location is called a/an ....
   a. wetland b. watershed c. lake d. estuary
8. All of the following cause water pollution except the existence of a .... across a river.
   a. dam b. factory
   c. farm d. trash dump
9. Small .... and .... are examples of river tributaries.
   a. bays - creeks b. creeks - oceans
   c. seas - streams d. streams - creeks
10. The water of a small creek flows into ....
    a. an ocean b. a bigger river c. a smaller stream d. a sea
11. The small bodies of water that flow into a bigger river are called ....
    a. estuaries b. tributaries c. watersheds d. bays

12 .... of resources requires managing their usage methods.

a. Depletion b. Sustainability c. Renewability d. Scarcity

13 Wadi Al-Hitan Protectorate is an example of the .... of natural resources.

a. sustainability b. depletion c. quality d. preservation

14 All the following are renewable resources, except ....

a. plants b. animals c. coal d. a and b

15 Plastic spoons are made from products of ....

a. oil b. trees c. animals d. paper

16 .... of natural resources means restricting access to or using these resources.

a. Restoration b. Pollution c. Preservation d. Sustainability

17 .... isn't an item used to make a model of a water filter.

a. Cotton b. Sand c. Charcoal d. Oil

18 All of these can be removed by a simple water filter, except ....

a. mud b. rock pieces c. salt d. dirt

19 Humans can .... waste water to recycle it and use it again.

a. filter b. boil c. freeze d. conserve

2 Put (✓) or (✗):

1 Oceans are connected together and surround all continents. ( )

2 A lake is a body of water that is surrounded by land. ( )

3 The ocean's floor may have mountains, plains, and plateaus. ( )

4 Extinction of the frogs may happen due to the limited amount of salt water on Earth. ( )

5 Conservation and poor quality are from the concerns that threat fresh water on Earth. ( )

6 Resources of fresh water on Earth are unlimited. ( )

7 Water can flow from a bigger river to a tributary. ( )

8 What happens in tributaries affects what happens in upstream bodies of water. ( )

9. The water of a small stream flows directly into an ocean. ( )
10. Clothes can be made from the cotton or wool of the sheep. ( )
11. It is forbidden to hunt fish in Ras Mohammed Protectorate. ( )
12. Wadi Al-Hitan is an example of harvesting natural resources. ( )
13. Polluting water will not affect its future supply. ( )
14. Unequal distribution of resources leads to the unsustainability of resources. ( )
15. When cows are placed in many small areas of grass, the grass will disappear. ( )
16. Burning fossil fuels causes soil pollution that causes the survival of plants and animals. ( )
17. Fresh water is a limited nonrenewable natural resource. ( )
18. Humans can't recycle waste water to reuse it. ( )
19. Overpopulation doesn't affect the resources sustainability. ( )
20. In a water filter model, the water passes first on the sand, then on the cotton balls, and then on the charcoal. ( )
21. Wastewater is water that has already been recycled and filtered. ( )

3 Write the scientific term:

1. It is the water stored in the cracks among rocks that lie beneath the Earth's surface. (..........)
2. It is a land which is partially covered with water. (..........)
3. It is a body of water that has a mixture of salt water and fresh water. (..........)
4. They are large bodies of water that surround all continents. (..........)
5. It is a structure built on a river to control and conserve water. (..........)
6. They are maps used to know the direction of the flow of water. (..........)
7. It is a way of restricting access to or use of resources. (..........)

8. It is using resources in a way that does not negatively affect the future supply of them. (..................)
9. It is a human activity that leads to decreasing the number of fish. (..................)
10. It is the process of removing harmful materials from water. (..................)
11. It is the water that has already been used in homes. (..................)

4 Correct the underlined words:

1. The Africa Continent is surrounded by **rivers**. (..................)
2. You should **increase** the time of taking a shower. (..................)
3. Humans control and conserve water by building **water turbines**. (..................)
4. Heavy rainfall makes the water level **drop**, causing flooding. (..................)
5. Water **balance** causes drought or flooding. (..................)
6. About 10% of the world's animal species live only in **saltwater** habitats. (..................)
7. In a water filter model, water passes first through **charcoal**. (..................)

5 Complete the following using the words between the brackets:

A (more than - electricity - lakes - ecosystems - fresh water)

1. We must take a quick shower to conserve ....
2. Most .... contain fresh water.
3. In the High Dam, water is used to generate ....
4. There is an amount of groundwater on Earth .... the water in rivers and lakes.
5. Estuaries are .... to thousands of plants and animals.

B (tributary - death - dam - factory - upstream - wind)

1. The poor quality of water leads to the extinction of some organisms or causes the .... of others.

2 What happens .... will affect downstream bodies of water.

3 The litter of a trash dump near a .... is blown by .... to other bodies of water connected to it.

4 Building a .... near a tributary affects the water quality downstream, while building a .... affects the water level downstream.

C (undrinkable – wastewater engineers – preservation – dry up – Water filters)

1 Restricting access to consume resources in Ras Mohammed Protectorate is called ....

2 When fresh water is used, it becomes ....

3 If people in Siwa overuse the groundwater, the wells may ....

4 .... remove harmful materials from waste water.

5 The scientists that work at wastewater treatment plants are called ....

6 Cross out the odd word:

1 Glaciers – Oceans – Streams – Rivers (..................)

2 Rivers – Rain – Groundwater – Oceans (..................)

3 Sand – Oil – Charcoal – Cotton balls (..................)

7 Choose from column (A) what suits it in column (B):

A

Column (A)	Column (B)
1 Oceans	a. are located where a river meets a sea.
2 Estuaries	b. often start in mountains.
3 Rivers	c. are considered lands which are partially covered with water.
4 Swamps	d. surround continents.

1 .... 2 .... 3 .... 4 ....

B

Column (A)	Column (B)
1 Solar energy	a. is the water that has been used before in homes and industries.
2 Wastewater	b. observe the water quality during water treatment.
3 Gold	c. is among metals.
4 Bahr Al-Baqar	d. plays an important role in the water cycle.
5 Wastewater engineers	e. is a wastewater treatment plant in Egypt.

1 .... 2 .... 3 .... 4 .... 5 ....

8 Study the following figure, then complete:

1. Water in area (........) is a mixture of salt and fresh water.
2. Water in area (........) is salt water.
3. Water in area (........) is fresh water.

9 Study the following figure, then choose the correct answer:

1. The body of water in area "A" could be a creek. (   )
2. The body of water in area "D" could be a sea. (   )
3. If a factory is built in area "C", the body of water in area "A" will get polluted. (   )
4. The body of water in area "B" could be an ocean. (   )
5. If a dam is established on the body of water in area "A", the amount of water in area "E" will change. (   )

10 Study the following figure, then answer the questions below:

1. What is the name of the opposite model?

   ....

2. Label the figure:

   A. .... B. ....

   C. .... D. ....

   E. ....

A
B
C
D
E

3. What is the importance of this model?

   ....

4. What is the name of this process?

   ....

11 Give reasons for:

1. We should turn off water during brushing our teeth.

   ....

   ....

2. Some fish and amphibians that live in fresh water go extinct.

   ....

   ....

3. The poor quality of fresh water affects the living organisms that live in it.

   ....

   ....

4. Egypt has established Ras Mohammed Protectorate.

   ....

   ....

12 What happens if:

1. Water is collected in a low-lying area?

....

....

2. The water of a river meets the water of a sea?

....

....

3. The quality of water in a pond becomes poor?

....

....

4. The rate of rainfall on a river increases?

....

....

5. A factory is built near a stream that flows into a big river?

....

....

6. We place cows in many small areas of grass?

....

....

7. You add some sand and mud to pure water?

....

....

8. Wastewater engineers test the treated water before releasing it to rivers?

....

....





Patterns in the Sky

Unit Concepts:

Concept 1 Effects of Gravity

Concept 2 Patterns of Motion in the Sky

Unit Project Sundial

Concept 1 Effects of Gravity

1 Summary of Concept 1

Gravity

1. Gravity is the force of attraction between objects that have mass.
2. It is an invisible force that acts on all objects on or near Earth.
3. If there is no gravity, we will float like astronauts in space.
4. It is a pulling force only.

Examples of Gravity Forces

1. The Earth's gravity

It pulls objects with mass down to the center of the Earth.

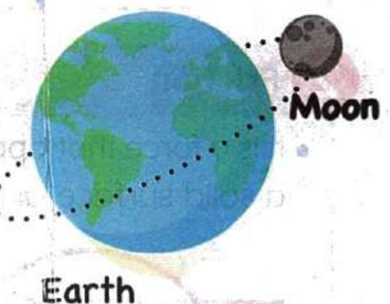
2. The Sun's gravity

It keeps the planets in fixed orbits around the Sun.



3. The moon's gravity

It affects the ocean tides.



Factors affecting gravity between two objects:

1. The mass of the two objects
2. The distance between the two objects

Force: It is a pull or push applied to an object to make it move.

Motion: It is a change in the position of an object compared to another object.

Types of Forces

1 Magnetism

- It is the force of **attraction** or **repulsion** between two magnets or between a magnet and some objects.
- Magnets have a kind of **invisible** force that cannot be seen, known as magnetism.

The attraction force of the magnet (Pulling Force)

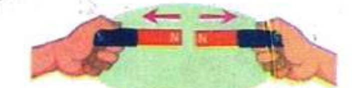
1. A magnet pulls another magnet.



2. A magnet attracts magnetic materials, such as iron, cobalt, and nickel.

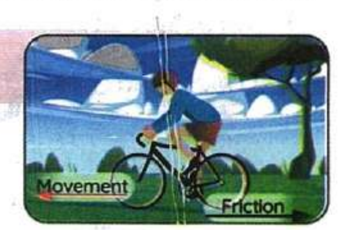
The repulsion force of the magnet (Pushing Force)

1. A magnet pushes (repels) another magnet.



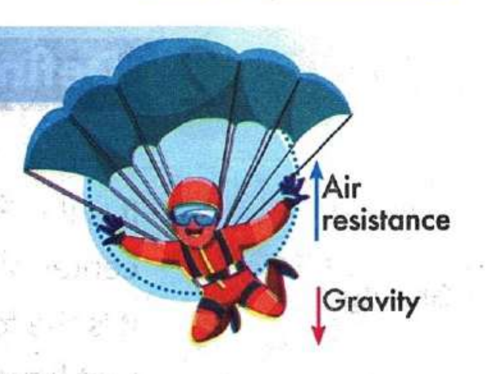
2 Friction

- It is a force that opposes the motion of a body across a solid surface or through a gas or liquid.



1. It arises between two objects touching each other.
2. It acts in the **opposite** direction of the object's motion.
3. It **slows down** the object's movement.

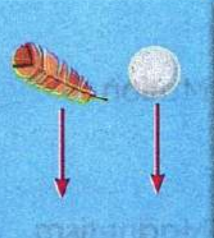
3 Air Resistance



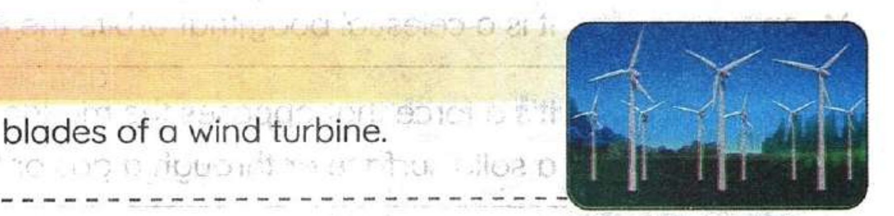
- It is a force that **opposes** the movement of an object as it passes through the air.
- When a skydiver opens his parachute during landing, air resistance acts against gravity, causing his drop to slow.

If there is no air resistance,

- all bodies will reach the ground at the same time because the force of gravity is constant and acts on all bodies in the same way.

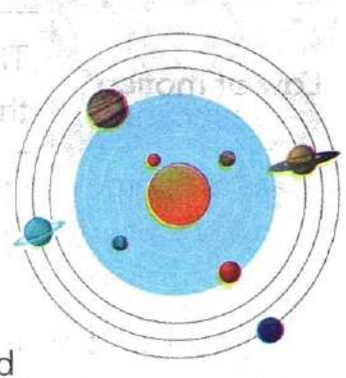


4 Wind Force

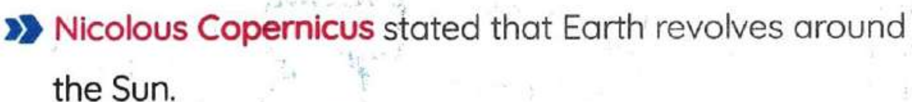


- Wind pushes the blades of a wind turbine.

Solar System



- Our solar system consists of the Sun, and eight planets revolve around it.
- Each planet revolves around the Sun in a fixed path called an orbit, which has an ellipse (oval) shape.



- Nicolous Copernicus stated that Earth revolves around the Sun.
- Earth revolves around the Sun at a speed that nearly equals 107,000 km per hour.

2 Definitions of Concept 1

Gravity	• It is the force that pulls objects with mass towards the center of the Earth. • It is the force of attraction that exists between objects that have mass.
Force	It's a pull or a push that is applied to an object.
Motion	It is a change in the position of an object compared to another object.
Magnetism	It's the force of attraction or repulsion between two magnets or between a magnet and some objects.
Moon	It is a celestial body that orbits the Earth in a fixed orbit.
Friction	It's a force that opposes the motion of a body across a solid surface or through a gas or liquid.
Air resistance	It's a type of friction force that opposes the movement of an object as it passes through air.
Law of motion	The force of gravity is constant and acts on all objects in the same way.

3 Give Reasons for... Concept 1

1. The moon is attracted to Earth.
   - Due to the gravitational force of the Earth.
2. The astronaut's body floats in space.
   - Because there is no gravity in space.
3. When you throw a ball up into the air, its direction changes.
   - Because the direction of the ball changes because gravity pulls the ball downward.
4. The moon revolves around the Earth in a fixed orbit.
   - Due to the gravitational force of the Earth which attracts moon toward it.
5. The ball that weighs 100 gm falls faster than the ball that weighs 50 gm.
   - Because the gravitational force increases when its mass increases.
6. The moon does not crash into the Earth or collide with it.
   - Due to the gravitational force of Earth, which controls the motion of the moon in a fixed orbit.
7. The Earth's gravity is stronger than the moon's gravity.
   - Because Earth has bigger mass than that of the moon.
8. The bike stops after a while when you stop pedaling.
   - Due to the friction between the tires and ground, the bike slows down until it stops.
9. When skydivers release parachutes, their drop slows down.
   - To increase air resistance to the parachute and slow down his drop.
10. The Sun is considered as the center of the solar system.
    - Because the Sun has the largest gravity in the solar system.
11. Planets revolve around the Sun in fixed orbits.
    - Due to the gravity of the Sun.

4 What Happens if...? Concept 1

1. The skydivers get out of the airplane?
   - Skydivers will be pulled toward the ground by the effect of gravity.
2. The mass of the moon increases?
   - The gravity between the moon and the Earth increases, so the moon might crash into Earth.
3. The distance between the moon and Earth is doubled?
   - The gravitational force between them decreases, and the moon may float off into space.
4. There is no gravity on the Earth's surface?
   - All objects on Earth will float off into space.
5. You throw a ball up?
   - The direction of the ball changes due to the force of gravity.
6. The gravity between the Sun and the planets of solar system is absent?
   - All planets will float off into space and leave their orbits around the Sun.
7. A magnet is placed near to some paper clips?
   - The magnet will attract the paper clips.
8. A skydiver opens his parachute during landing?
   - Air resistance will increase, so the speed of his drop will decrease.
9. You drop a metal ball with heavy mass and a plastic ball with light mass from the same height?
   - The metal ball will reach the floor first.
10. You drop a paper clip and a feather from the same height?
    - The paper clip will reach the floor first.
11. There is no air resistance and you drop a hammer and paper at the same time from the same height?
    - They will reach the floor at the same moment.

5 Revision on Concept 1

1 Choose the correct answer:

1. Gravity keeps the moon in a fixed orbit around ....
   a. the Sun b. the Earth c. itself d. another moon
2. The Earth attracts the objects towards ....
   a. its center b. the sky
   c. the moon d. the Sun
3. What is the force that slows the drop of a skydiver in the air?
   a. Magnetism b. Gravity
   c. Air resistance d. a and c
4. The Earth's gravity .... objects towards its ....
   a. pushes –center b. pulls – poles
   c. pulls – center d. pushes – poles
5. The gravity force depends on the .... of an object.
   a. mass and color b. distance and speed
   c. mass and distance d. volume and height
6. The gravitational force of an object .... as its mass increases.
   a. equals zero b. increases
   c. decreases d. doesn't change
7. If the distance between the Earth and moon increases, the gravity between them ....
   a. increases b. decreases c. disappears d. doesn't change
8. You need to exert the greatest force to move ....
   a. a toy car b. a real bike c. a book d. a real car
9. The .... has the greatest gravity, because it has the .... mass.
   a. Sun - smallest b. moon - smallest
   c. Sun - greatest d. Earth - greatest

10. In the solar system, planets stay in their orbits due to the gravity of the ....
 a. moon b. Sun c. Mars d. Earth

11. When you throw up a ball in the air, its ...... changes due to the gravity.
 a. mass b. color c. volume d. direction

12. All objects on Earth are affected by the ...... force.
 a. gravity b. magnetism c. pushing d. electrical

13. When throwing an object vertically upwards, it ....
 a. moves fast towards space
 b. suspends in the air because its gravity is equal to that of Earth
 c. returns to Earth under the effect of gravity
 d. floats in space because there is no gravity

14. Magnetism is a force that attracts objects made of the following materials, except ....
 a. nickel b. cobalt c. iron d. wood

15. Friction force ...... the movement of objects.
 a. slows down b. increases c. speeds up d. doesn't affect

16. ...... is considered a type of friction force.
 a. Air resistance b. Magnetism c. Gravity d. Electrical force

17. A parachute in the air is affected by ...... and ....
 a. magnetism - gravity b. water resistance - gravity
 c. gravity - air resistance d. air resistance - magnetism

18. ...... is a factor that acts against gravity force.
 a. Magnetism b. The mass of an object
 c. Air resistance d. The shape of an object

19. Which one of the following is affected by more air resistance on dropping them from the same height?
 a. An iron nail b. A feather c. A hammer d. A wooden cube

20. Nicolous Copernicus states that "......" is the center of the solar system.
 a. Moon b. Earth c. Sun d. Mars

2 Put (✓) or (✗):

1. Gravity pushes the objects away from the center of the Earth. ( )
2. The gravity of the moon affects the ocean tides. ( )
3. Without the Earth's gravity, the moon would float off into space.( )
4. The change in an object's position is called force. ( )
5. Magnetism may be a pushing or pulling force. ( )
6. Magnets attract paper clips, which is evidence that magnets have a force.( )
7. The magnet can only exert a pulling force. ( )
8. The Earth's gravity keeps all planets moving in their orbits. ( )
9. A static book on a table isn't affected by gravity. ( )
10. Gravity doesn't affect the direction of the moving objects. ( )
11. Bigger planets have more gravity than small planets. ( )
12. The attraction force between Sun and Earth is less than that between the Earth and moon. ( )
13. Gravity is an invisible force, but we can see its effect. ( )
14. A magnet has the force to attract metals, such as silver and gold. ( )
15. Air resistance pulls a skydiver down towards the ground. ( )
16. A parachute helps in increasing the speed of an object falling to the ground. ( )
17. Magnets can attract all materals. ( )
18. In the absence of air resistance, a parachute will drop faster to the ground. ( )
19. Both gravity and air resistance act in opposite directions from each other. ( )
20. A paper clip reaches the ground before a feather. ( )

3 Write the scientific term:

1. It is the change in an object's position relative to another object.

(..................)

2. The effect that pulls or pushes objects to make them move. (..................)
3. It is the force that pulls the objects down towards the Earth's surface. (..................)
4. It is a celestial body that orbits the Earth. (..................)
5. It is a star that is located in the center of the solar system.(..................)
6. It is the force of the magnet that pulls metal objects toward it. (..................)
7. It is the force that opposes the movement of an object across a solid surface, liquids, or gases. (..................)
8. It is a type of friction force that slows down the falling of objects in the air. (..................)
9. It is a tool that the skydiver uses to slow his drop. (..................)

4 Correct the underlined words:

1. The gravity of the <u>Sun</u> affects the ocean tides. (..................)
2. The gravity of the Earth is stronger than the gravity of the <u>Sun</u>. (..................)
3. When two magnets repel, they <u>pull</u> each other. (..................)
4. Friction force <u>speeds up</u> the movement of the object. (..................)
5. <u>Gravity</u> is the force that pulls objects made of iron toward a magnet. (..................)
6. <u>Magnetism</u> always acts against gravity for a falling object in the air. (..................)
7. Gravity always affects the <u>mass</u> of objects thrown up in the air. (..................)

5 Complete the following using the words between the brackets:

A (center - moon's gravity - Earth's gravity - Sun - orbit)

1. The .... keeps the moon revolving in its .... around Earth.
2. The gravity between the .... and planets, keeps planets revolve in fixed orbits.
3. Gravity pulls the skydivers towards the .... of Earth.
4. The .... affects ocean's tides on Earth.

B (Force - more - Gravity - magnetism - space - less)

1. A person in a blimp flying in the sky is affected by .... gravity than a person standing on the ground.
2. .... is a pull or push that is applied to an object.
3. .... exerts only pulling force, while .... could exert pushing or pulling forces.
4. There's no gravity in ....
5. Earth has .... gravity than moon, because Earth has more mass.

6 In the following figure:

1. The force shown in the opposite figure is called .... (gravity - magnetism).
2. These two magnets repel, which means that they .... (push - pull) each other.

7 Look at the following figure, then answer:

1. .... has the largest mass.
2. .... has the lowest force of gravity,

8 In the following figures:

A In which figure the feather and the ball will reach the ground at the same time?

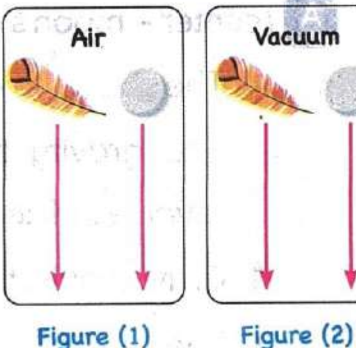


Figure (1) Figure (2)

B Choose:

In figure (1), if the feather reaches the ground in 10 seconds, so the ball takes .... (15 - 10 - 8) seconds to reach the ground.



9 Give reasons for:

1. The moon is attracted to Earth.

....

....

2. Paper clips are pulled towards a magnet.

....

....

3. Astronauts float into space.

....

....

4. When you throw up a ball in the air, its direction changes.

....

....

5. Gravity of Earth is greater than gravity of the moon.

....

....

6. Skydivers land safely when they open their parachutes.

....

....



10 What happens if:



1. The distance between Earth and the moon is doubled?



2. The mass of the moon decreases to half?

3. A magnet is placed near to some paper clips?

4. You press the brakes of your bike?

5. A skydiver opens his parachute on landing?

Concept 2 Patterns of Motion in the Sky

1 Summary of Concept 2

Rotation: It is the spinning of an object on its axis.

Revolution: It is the orbiting of an object around another object.

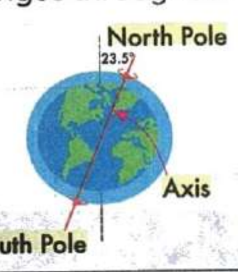
Cycle: It is a series of events that are repeated in the same order.

Earth's axis: It is an imaginary line passing through the North Pole and South Pole of Earth.

Earth has two motions

1 Earth rotates around its axis. (Takes one day)

- Earth rotates counterclockwise on its vertical axis at a very high speed.
- Earth is slightly tilted on its axis, where the angle of tilt changes throughout the year.

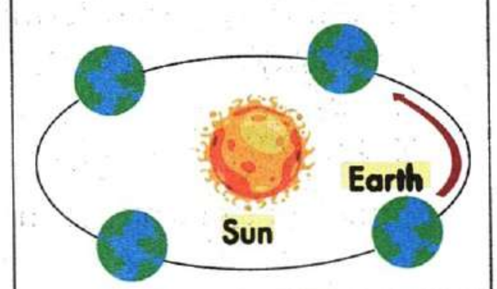


Earth's rotation on its axis causes:

1. The cycle of day and night occurs.
2. The Sun, planets, and stars appear to move across the sky.
3. Shadows of objects move throughout the day.

2 Earth revolves around the Sun in an orbit. (Takes one year)

- Earth's path around the Sun is elliptical (oval).



Earth's revolution around the Sun causes:

- The cycle of four seasons.

NOTE:

- We can't feel the Earth's spinning on its axis, as we move at the same speed of the Earth's rotation on its axis.

Shadow:

- You can observe shadows of objects moving throughout the day.
- The factors that affect the length and angle of a shadow:
  - The position of the Sun affects the length and angle of the shadow.
  - The sunlight availability that changes with the change of seasons.

	In the early morning or in late afternoon	At noon
The Sun's position	The Sun is low in the sky (in the east or west)	The Sun is high above us in the sky.
The length of the formed shadow	An object has the longest shadow. Morning Afternoon	An object has the shortest shadow. Noon

Universe:

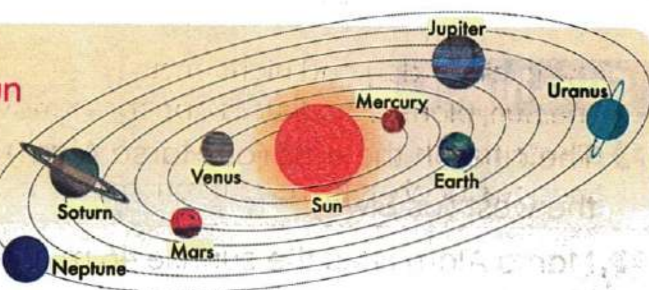
- The wide space that contains celestial objects such as galaxies, stars, planets, moons, comets, meteors and even human-made satellites like International Space Station ....., etc.

Galaxy:

- A group of stars, planets and gases are held together by gravity.

Solar System:

- The solar system includes the Sun and eight planets that revolve around the Sun in fixed orbits.
- Planets rotate in their orbits at different speeds.



- Jupiter is the fastest-rotating planet in the solar system.

Stars

1. Stars are giant spheres of superhot gases made of mostly **hydrogen** and **helium** gases.
2. Stars appear to move across the night sky due to the rotation of the Earth on its axis.
3. Some stars are larger than our Sun, while others are smaller.

The Sun

1. Sun is a **medium-sized star**.
2. Sun is the **center** of the solar system.
3. The Sun provides the Earth with **heat** and **light** energies.

Sunshine:

- The cities in the east (as Marsa Alam) see the sunrise before the cities in the west (as Siwa).
- Marsa Alam sees the sunrise 46 minutes before Siwa.
- The length of day in Marsa Alam is always longer than it is in Siwa.

Constellation


Orion constellation

Constellation

- It is a group of stars that looks like a pattern of a certain shape in the sky.

Properties of Stars in Constellations

1. Stars are not connected to each other at all.
2. Stars are far away from the Earth.
3. Stars' positions don't change.

Importance of Constellations

- Locations of constellations during the year help us determine the main four directior^ (north – south – east – west).



Motion of Constellations

Stars seem to move across the night sky. But, in fact, the positions of the stars do not change. → **Reason:** Earth's rotation around its axis

You can see more different constellations in the winter than in the summer. → **Reason:** Earth's revolution around the Sun

Moon:



- The moon doesn't create its own light, but it reflects the sunlight that falls on it.
- Moon phases change as the moon revolves around the Earth.
- Moon phases are changed during the lunar (Hijri) months.

Guidelines to Help Students

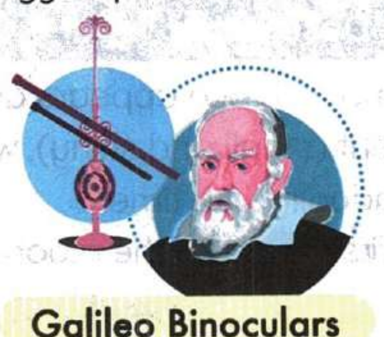
If the question says:	Moon's phase will be:
The moon appears fully illuminated. (It appears as a completely bright circle.)	Full Moon
The moon appears fully darkened.	New Moon
One half is illuminated + the other half is darkened.	First or Second Quarter
The edge of the moon's face appears illuminated. (The bright part is less than the dark one.)	First or Second Crescent
The illuminated part of the moon's face increases gradually. The bright part is greater than the dark one.	First Gibbous
The illuminated part of the moon's face decreases gradually. (The bright part is greater than the dark one.)	Second Gibbous

The moon phases during the lunar month "Hijri month":

Moon Phase	Description
① First Crescent	• The edge of the moon's face appears as an illuminated crescent (small and shiny), where its size increases gradually with time. • This phase is the first phase of the moon phases.
② First Quarter	• One half of the moon's face is illuminated. • The other half of the moon's face is darkened.
③ First Gibbous	• The bright illuminated ened part of the moon's face increases gradually. • The line separating the illuminated part and the darkened part appears curved.
④ Full Moon	• The apparent face of the moon that faces the Earth is fully illuminated. • This phase appears in the middle of the lunar month.
⑤ Second Gibbous	• The illuminated part of the moon's face decreases gradually. • The line separating the darkened part and the illuminated part appears curved.
⑥ Second Quarter	• One half of the moon's face is darkened. • The other half of the moon's face is illuminated.
⑦ Second Crescent	• The edge of the moon's face is an illuminated crescent.
⑧ New Moon	• The apparent face of the moon that faces the Earth is fully darkened. • This phase appears on the last day of the lunar month.

Using Technology to Study the Universe

Technology helps us invent some tools, such as:


Galileo Binoculars


Hubble Telescope

Importance of binoculars and telescopes:

They help us take a closer look at more distant objects in greater detail, such as:

1. The surface of the moon
2. Asteroids
3. Our neighboring planets
4. Stars in and out our galaxy

Planetarium

It is a place where we can see images of stars, planets, constellations, and other celestial bodies.

How the Planetarium Works

1. A projector that displays images on its ceiling that looks like a dome.
2. Special computer programs are used to show pictures of:
   - what the sky looks like during certain times of the month or year.
   - what the sky looked like many years ago.


Copernicus

- He proved that the Sun is the center of the solar system.

2 Definitions of Concept 2

Earth's axis	It's an imaginary line passing through the North Pole and South Pole of Earth.
Earth rotation	It is the spinning of the Earth on its axis.
Earth revolution	It is the orbiting of the Earth around the Sun.
Cycle	It is a series of events that are repeated in the same order.
Solar system	It's a system that includes the Sun and eight planets that revolve around the Sun in fixed orbits.
Jupiter	It is the fastest-rotating planet on its axis in the solar system.
Constellation	It is a group of stars that forms a pattern or looks like a certain shape in the sky.
Full moon	It's a moon phase that appears in the middle of the lunar month, in which the moon is fully illuminated.
First Crescent	It is the first phase of the moon phases.
New Moon	It's a moon phase that appears on the last day of the lunar month, in which the moon is totally dark.
Planets	They're dark celestial bodies that revolve around the Sun in fixed orbits.
Sun	• It's a medium-sized star. • It is the only star in the solar system. • It is the center of the solar system.
Stars	They are giant spheres of superhot gases; most of them are hydrogen and helium.
Galaxy	It's a group of stars and other celestial objects held together by gravity.
Universe	It's a wide space that contains celestial objects, such as stars, galaxies, comets, meteors, and human-made satellites.
Atmosphere	It is a protective layer around Earth that allows some light waves to pass through while blocking some other light waves..
Planetarium	It is a place where we can see images of stars, planets, constellations, and other celestial bodies.

3 Give Reasons for... Concept 2

1. The regular pattern of day and night occurs every day.
   - Due to the rotation of the Earth around its axis.
2. All the time, half of the Earth has day and the other half has night.
   - Due to the rotation of the Earth around its axis.
3. The Sun appears to move across the sky throughout the day.
   - Due to the rotation of the Earth around its axis.
4. The occurrence of four seasons.
   - Due to the Earth's revolution around the Sun.
5. Sunrise and sunset times are different each day on Earth
   - Because of Earth's elliptical orbits and the tilt of the Earth on its axis.
6. We can't feel the fast movement of the Earth.
   - Because we are moving at the same speed of Earth.
7. The position of the Sun changes in the sky throughout the day.
   - Due to the Earth's rotation around its axis.
8. The movement of shadows during the day.
   - Due to the Earth's rotation around its axis.
9. The shadow was important for the ancient Egyptians
   - They used shadows to know time by using the sundial.
10. Some constellations still exist even though you cannot see them.
    - Because they are just not visible from where you are located on Earth.
11. The appearance of star patterns and constellations is associated with specific seasons.
    - Due to the revolution of the Earth around the Sun.
12. The moon appears bright in the sky, although it doesn't create its own light.
    - Because the moon reflects the sunlight falling on it.
13. Stars seem bright in the night sky.
    - Because they are made of hot gases.

14 **The moon phases change during the Hijri month.**

- Due to the revolution of the moon around Earth.

15 **Binoculars and telescopes have great importance for humans.**

- They help us take a closer look at more distant objects in greater detail, such as the moon's surface, asteroids, our neighboring planets, and stars

16 **The Sun looks much bigger than other stars.**

- Because the Sun is the nearest star to Earth.

17 **Astronauts cannot be sent to study stars or other celestial bodies.**

- Because the universe is so big, and these celestial bodies are just too far away.

4 What Happens if...? Concept 2

1 **The Earth rotates around its axis?**

- The pattern of day and night will happen.

2 **The Earth doesn't rotate around its axis?**

- Day and night pattern will not happen.

3 **You look at the sky in the middle of the day (at noon)?**

- You will see the sun in the center of the sky.

4 **Half of the Earth doesn't receive any sunlight?**

- This half of Earth will have night.

5 **You face the north direction of the Earth and look at the sky in late afternoon?**

- The Sun would be to your left in the sky.

6 **The Earth revolves around the Sun?**

- The cycle of four seasons will occur.

7 **The sunrays fall on an object when the Sun is at noon? (According to the shadow's length)**

- A short shadow of the object will be formed.

8 **The sunrays fall on an object when the Sun is at the early morning? (According to the shadow's length)**

- A long shadow of the object will be formed.

5 Revision on Concept 2

1 Choose the correct answer:

1. Gravity keeps the moon in a fixed orbit around ....
   a. the Sun b. the Earth c. itself d. another moon
2. The Earth takes .... to complete one rotation around its axis.
   a. whole day b. 24 days c. 12 hours d. 48 hours
3. Day and night phenomenon occurs due to the rotation of the Earth around ....
   a. the Sun b. its axis
   c. the moon d. the solar system
4. The Sun always rises from the .... and sets in the ....
   a. west - east b. south - west c. east - south d. east - west
5. The number of stars in the solar system is ....
   a. one b. eight c. nine d. two
6. The solar system includes ....
   a. one moon only b. planets only
   c. the Sun and planets d. stars and galaxies
7. The Earth's axis is ....
   a. vertical b. horizontal c. circular d. real
8. A city in the west of Egypt sees the sunrise .... another city in the east.
   a. after b. before
   c. at the same time d. earlier
9. The Earth's rotation on its axis causes all the following, except the ....
   a. sunrise and sunset of the Sun b. sequence of day and night
   c. movement of shadow d. sequence of seasons
10. .... depends on the movement of shadow throughout the day.
    a. Sunrise b. Sunset c. Sundial d. Hand watch
11. The shortest shadow of an object is formed ....
    a. in morning b. in afternoon c. at noon d. at night

12 Constellations may only be visible during certain seasons due to the Earth's revolution around ....

a. the Sun b. its axis c. the moon d. Jupiter

13 Constellation appears .... in the sky during the year.

a. at different position
b. at the same position
c. in the winter only
d. in the summer only

14 Changing the location of the Sun in the sky changes the .... of the shadow.

a. length
b. angle
c. color
d. length and angle

15 The moon appears completely dark in .... phase, while it appears completely bright in .... phase.

a. Full Moon – New Moon
b. New Moon – First Quarter
c. New Moon – Full Moon
d. Full Moon – Second Crescent

16 The cycle of the moon lasts about a ....

a. day b. year c. month d. week

17 .... are made of hot gases, so they seem bright.

a. Planets b. Moons c. Stars d. Moon and Sun

18 The location of constellations in the sky across the year helps us determine the ....

a. time b. main directions c. weather d. climate

19 Which statement about stars is true?

a. Stars are made of hot liquids.
b. Stars in constellations are so close to us.
c. All stars have the same size.
d. Stars are made of hot gases.

20 Moon revolves around the Earth in a/an .... orbit.

a. circular b. straight c. elliptical d. rectangular

21 Moon appears as a completely bright circle at .... phase.

a. New Moon
b. Full Moon
c. Second Quarter Moon
d. First Quarter

22 .... has the greatest gravitational force in the solar system.

a. Jupiter b. Moon c. Earth d. Sun

23. Some telescopes on the Earth's surface can't observe distant celestial bodies due to the presence of ....

    a. sunlight **b.** rocks **c.** atmosphere **d.** sound waves

24. All the following can be seen in the night sky, except ....

    a. moons **b.** the Sun **c.** stars **d.** constellations

2 Put (✓) or (✗):

1. Day and night pattern occurs due to the revolution of the Earth around the moon. (   )
2. The Earth revolves around the Sun once every 24 hours. (   )
3. The Earth takes 12 hours to make a half rotation around its axis. (   )
4. The Sun appears in the same place in the sky all day. (   )
5. The Sun appears in the east direction during the early morning.(   )
6. Earth rotates anticlockwise on its axis from east to west. (   )
7. Earth rotates slower than Jupiter, so the day on Jupiter is longer than 24 hours. (   )
8. The angle of the tilt of the Earth on its axis is constant all the year.(   )
9. The length of day and night are always equal during the winter.(   )
10. Earth rotates around its axis at low speed. (   )
11. Constellations have similar shapes in the sky. (   )
12. You can see the same constellations in the winter and summer. (   )
13. Moon and stars make their own light. (   )
14. Both Earth and moon orbit the Sun. (   )
15. At full moon, we can't see the moon in the sky. (   )
16. The New Moon phase occurs when the moon is between the Earth and the Sun. (   )
17. Stars are superhot gaseous sphere; most of them are helium and nitrogen. (   )
18. The Sun is necessary for the continuity of life on Earth. (   )

3 Write the scientific term:

1. It is an imaginary line passing through the North Pole and South Pole of the Earth. (..................)
2. It is the time taken by Earth to complete one rotation around its axis. (..................)
3. It is the fastest planet during its rotation on its axis in the solar system. (..................)
4. It includes the Sun and eight planets revolving around it. (..................)
5. It is a group of stars that looks like a certain shape in the sky. (..................)
6. It is the phase of the moon that appears in the middle of the lunar month. (..................)
7. It is the phase of the moon that appears in the last day of the lunar month. (..................)
8. It is a celestial body that orbits the Earth. (..................)
9. They are giant spheres of superhot gases; most of them are hydrogen and helium. (..................)
10. It is a group of stars, planets, and gases are held together by gravity. (..................)
11. It is the wide space that contains celestial objects, such as galaxies, stars, and planets. (..................)
12. He is the scientist who proved that the Sun is the center of the solar system. (..................)
13. It is the nearest star to the Earth. (..................)
14. It is a place where people can see images about planets, stars, constellations, and other celestial bodies. (..................)

4 Correct the underlined words:

1. The Earth rotates **clockwise** around its axis. (..................)
2. Planets rotate on their axes at **the same** speed. (..................)
3. The Earth orbits the Sun in a **circular** path. (..................)
4. The Earth rotates around its axis once every **30** hours. (..................)

5. The **moon** is considered a medium star. (..........)
6. **First Gibbous** phase follows the First Crescent phase. (..........)
7. The solar system contains more than 200 **stars**. (..........)
8. The planetarium has a **triangular** ceiling. (..........)

5 Complete the following using the words between the brackets:

A (planets – reflects – day – middle – night – moon)

1. When half of the Earth faces the Sun, it has .... and the other half has ....
2. The Sun can be seen above in the center of the sky at the .... of the day.
3. Both .... and .... don't make their own light.
4. We see the moon bright in the sky because it .... the sunlight.

B (west – axis – Sun - east – 24 hours - tilt)

1. The Earth is slightly .... around its axis.
2. Earth rotates anticlockwise around its axis from .... to ....
3. Earth rotates around its vertical .... every ....
4. The solar system includes the .... at its center and eight planets around it.

C (Sun's position - east – amount of sunlight - shortest- pattern)

1. The length and angle of shadow depend on the .... reaching the Earth, and the .... in the sky.
2. A constellations is a group of visible stars that form a ....
3. At noon, the Sun forms the .... shadow of objects.
4. Every night, we can see stars appear from the .... direction.

D (helium – heat – hydrogen – oxygen – light)

1. The Sun provides Earth with .... and ....
2. Most of heat and light energies of the Sun are produce due to the reaction between .... and ....

6 Cross out the odd word:

1. New Moon – Full Moon – First Quarter – Day and Night(..................)
2. Cycle of day and night – Cycle of four season – Change in the length of the shadow – Stars appears to move (..................)

7 Choose from column (A) what suits it in column (B):

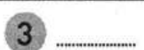
A

Column (A)	Column (B)
1 The Earth's axis	a. is the center of the solar system.
2 The Sun	b. is resulted from the Earth's rotation on its axis.
3 Day and night cycle	c. is resulted from the Earth's revolution around the Sun.
4 Seasons cycle	d. an oval path.
5 Earth's revolves around the Sun in	e. is vertical and passes through the two poles of Earth.

1 .... 2 .... 3 .... 4 .... 5 ....

B

Column (A)	Column (B)
1 The Sun	a. is the first-time piece used by ancient Egyptians.
2 Sundial	b. causes constellations appear at different locations across the year.
3 Earth's revolution around the Sun	c. causes the stars to appear moving across the night sky.
4 Earth's rotation around its axis	d. is a medium-sized star.

1 .... 2 ....  3 .... 4 ....

8 Study the following figures, then put (✓) or (✗):

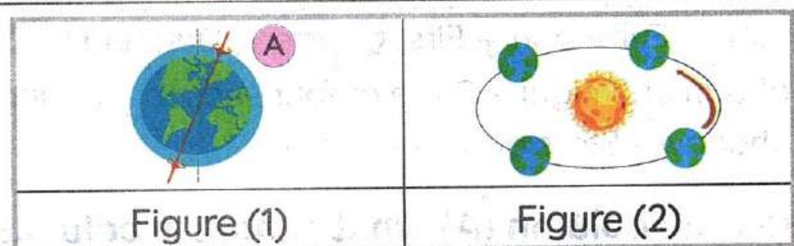


Figure (1)	Figure (2)

1. Figure (1) shows the Earth's rotation around its axis. ( )
2. Figure (2) represents the revolution of the Sun around the Earth. ( )
3. Cycle of day and night occurs due to the movement of Earth in figure (1). ( )
4. The line (A) in figure (1) is a real line that passes through Earth's two poles. ( )

9 Study the opposite figure, then put (✓) or (✗):

1. This constellation called "Orion". ( )
2. This constellation was named relative to a mythical hunter by the ancient Romans. ( )
3. We can see this constellation in the night sky all the year. ( )
4. This constellation is made of a group of stars. ( )

10 Study the opposite figure, then put (✓) or (✗):

1. This represents the Full Moon phase. ( )
2. This phase occurs on the last day of the lunar month. ( )
3. First Gibbous occurs before this moon phase. ( )
4. Second Quarter occurs after this phase. ( )

11 Study the following figure of the solar system, then put (✓) or (✗):

1. The Sun locates in the center of the solar system. ( )
2. The Sun is considered a planet. ( )
3. The Sun gives off light only. ( )
4. The Sun has the biggest mass in the solar system. ( )
5. Earth is the only planet in the solar system. ( )
6. There's only one moon in the solar system. ( )

12 Give reasons for:

1. The occurrence of day and night phenomenon.

2. The occurrence of four seasons.

3. The difference of day length from a city to another.

4. The day on Earth is longer than that on Jupiter.

5. We cannot feel the high speed of the Earth's rotation.

6. We can see different constellation across the year.

7. Stars seem bright at the night sky.

8. The moon appears bright at the night sky.

9 The moon goes different phases throughout the lunar month.

....

....

10 The Sun appears to move across the sky from east to west.

....

....

13 What happens if:

1 The Earth rotates around its axis?

....

....

2 Half of Earth faces the Sun?

....

....

3 The Earth stops rotating around its axis?

....

....

4 Both Earth and Jupiter rotate on their axes at the same speed?

....

....

5 Stars were made of cold gases?

....

....

6 The Sun's gravity disappears?

....

....

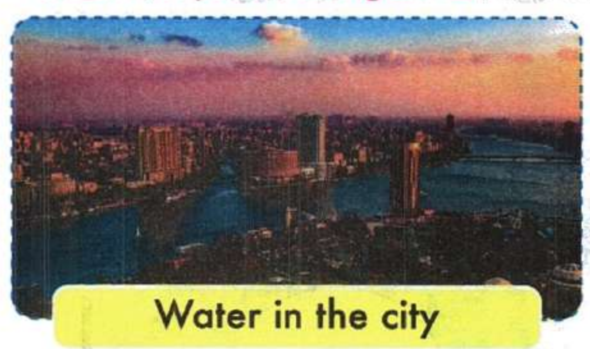
Projects



Project 1 Unit 3

We All Live Downstream

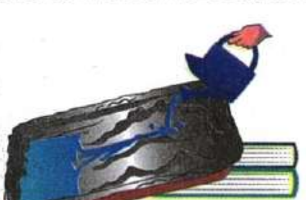
Wherever you live, there is water nearby. That water could be a small stream, a pond, a large river, or even an ocean.


Water in the city


Water near a Farm

- We will create a model of a watershed and simulate the introduction of pollutants.
- You will observe how pollutants travel and affect many different water resources.

Steps:





1. Use clay to create some landforms (mountains with different heights on a baking pan).
2. Cover the inner surface of the baking pan with aluminum foil.
3. Use books to lift up the baking pan from your side.
4. Pour some clear water from your side and observe how the water flows until it reaches the watershed.
5. Pour some colored water (representing pollutants) from another stream.

1. استخدم قِطَع الصلصال لتصميم تضاريس (جبالٍ مختلفة الارتفاع).
2. قم بتغطية صينية الخبز من الداخل بورق الألومنيوم.
3. استخدم مجموعة من الكتب؛ لجعل الصينية مائلة.
4. قم بصب القليل من المياه النظيفة، ولاحظ تحركها لأسفل حتى تصل للمستجمع المائي.
5. قم بصب الماء الملون (يمثل الملوثات) من جهتك، ولكن في مجرى مياه آخر.

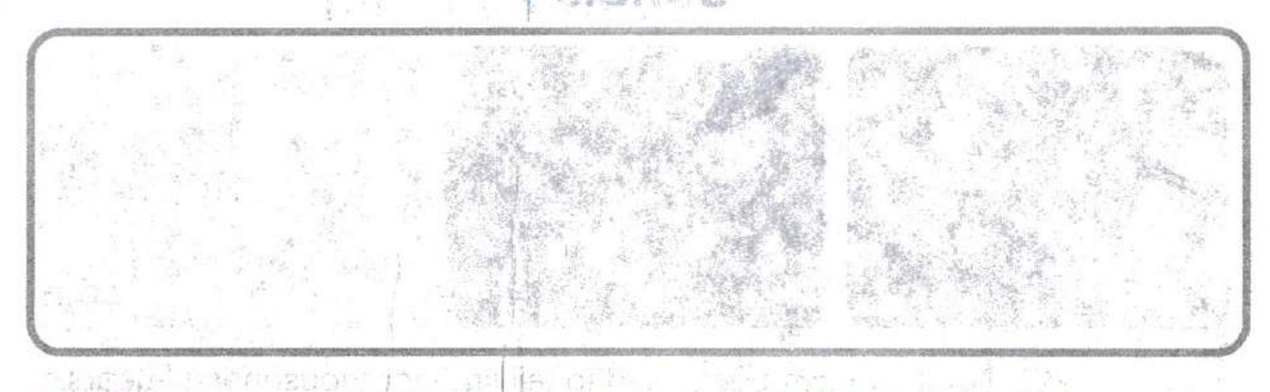
Observation:

- The red colored water flows down until it reaches the watershed and mixes with the clear water.

- ستلاحظ أن الماء الملون قد تحرَّك إلى المستجمع المائي، ثم اختلَط مع المياه الموجودة.

The Model

Now, create your model. Be sure to label the supplies you will use.



What will you do?

Trail	Water Quality	Where Will the Water Move to?	What Did the Water Do?	Potential Effects of the Water
Trail 1				
Trail 2				

Think About the Activity

1 What happens when pollution enters a watershed?

- Pollution can spread quickly from one water body to other water resources.

2 What does the saying "We all live downstream" mean?

- "We all live downstream" means if someone upstream pollutes a river, the pollution affects all the living organisms and resources downstream.

3 Why is it important to monitor the quality of different water resources?

- Because pollutants could enter the water at any time.
- Monitoring the quality will make people aware of what is going on and let scientists know when they need to act and make changes.

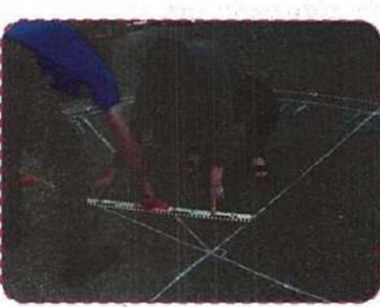
4 How is a model a valuable tool for studying watersheds?

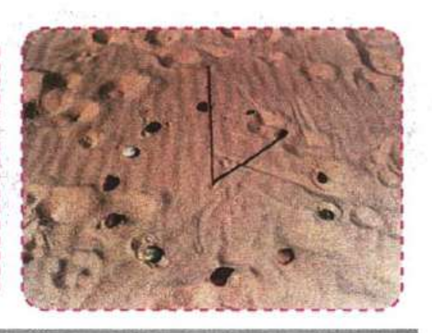
- Because it helps us see watersheds on a usable scale. We can fit the model on a table, while a real watershed is too large to see without special tools (such as flying in a plane or using special maps).

Project 2 Unit 4

Sundial







Importance	Sundials have been used to tell time for thousands of years. استخدم الإنسان الساعات الشمسية لمعرفة الوقت منذ آلاف السنين.
Structure	A sundial is usually a flat disk with a rod at the center, called a **gnomon**. الساعة الشمسية عبارة عن قرص مسطح مع عصا في المنتصف تُسمى عقربًا.
How It Works 	• Earth's rotation causes the shadow from the gnomon to move across the disk throughout the day. • The sundial must always stay in the same place. If it is turned, the shadow will tell the wrong time. • يتسبب دوران الأرض حول محورها في تحرك ظل العقرب على القرص طوال اليوم. • يجب أن تبقى الساعة دائمًا في نفس المكان؛ لأن تغيُّر مكانها سيخبرك بالوقت الخطأ.
Types	• Some sundials are about a half meter wide and about the right size for a garden. • Some sundials are many meters wide, and they are found in public parks. • Some sundials have no gnomon; they're called **human sundials**. A person must act as a gnomon. The person stands in the center where the gnomon would ordinarily be and observes where the shadow falls. • بعض الساعات الشمسية يكون عرضها نصف متر، ويكون حجمها مناسبًا لوضعها في الحديقة. • بعض الساعات الشمسية الأخرى يبلغ عرضها عدة أمتار، وتوجد في الحدائق العامة. • بعض الساعات الشمسية ليس لها عقرب، وتُسمى بالساعة الشمسية البشرية؛ حيث يقف الشخص في مركز القرص، ويلاحظ مكان سقوط الظل.

Steps:

1 Choose a location for your human sundial in the schoolyard.
2 Both your sundial and the human gnomon should be oriented to the north.
3 Your teacher will assist you in determining which direction is north using a compass.
4 Design your sundial. Label all the parts of your design.
5 Gather the materials you will use to build your model.

1 اختر موقعًا للساعة الشمسية فى فناء مدرستك.
2 يتم توجيه الساعة الشمسية والشخص الذي يقف فى منصف القرص (يمثل العقرب) فى اتجاه الشمال.
3 سيساعدك المعلم فى معرفة اتجاه الشمال عن طريق استخدام البوصلة.
4 صمِّم ساعتك الشمسية وقم بتحديد وضع العلامات. 5 أحضر المواد التي ستساعدك فى تصميم النموذج.

Safety note:

Remember to never look directly at the Sun. Doing so can permanently damage your eyes.

Think About the Activity

1 How did you decide **how large** your sundial would be?
- We looked at the lengths of our shadows at different times of the day and drew the circle small enough for the shadow to hit the hour markers.

2 What materials **did you choose** to mark the hours, and why did you choose them?
- We decided to use large rocks with painted numbers for the hour markers because they would be hard to move and the numbers would not wear out easily.

3 How did you test **the accuracy** of your sundial?
- After we placed the markers, we checked to see where our shadow fell at several different times during the day and adjusted the markers as needed to match the shadow.

» Draw your sundial design:

» Write or draw your answers to the questions in the chart:

What worked?	What didn't work?	What could work better?

Interdisciplinary Project

Water by the Sea

- About 70% of the Earth is covered by water.
- 96.5% of this water is salt water. • 3.5% of this water is fresh water.
- People can't drink ocean water because it is salty.
- Scientists designed a process known as "desalination" to remove salt and minerals from sea or ocean water to get drinkable water.

• 70 % من كوكب الأرض مُغطى بالماء. • 96.5 % من هذا الماء يعتبر ماء مالحًا. • 3.5 % من الماء يعتبر ماء عذبًا.

• لا يستطيع الناس شرب مياه المحيط رغم توافرها؛ لأنها مياه مالحة.

• صمَّم العلماء عملية (تحلية مياه البحر) لإزالة الأملاح من مياه البحار أو المحيطات؛ وبالتالي الحصول على مياه صالحة للشرب.

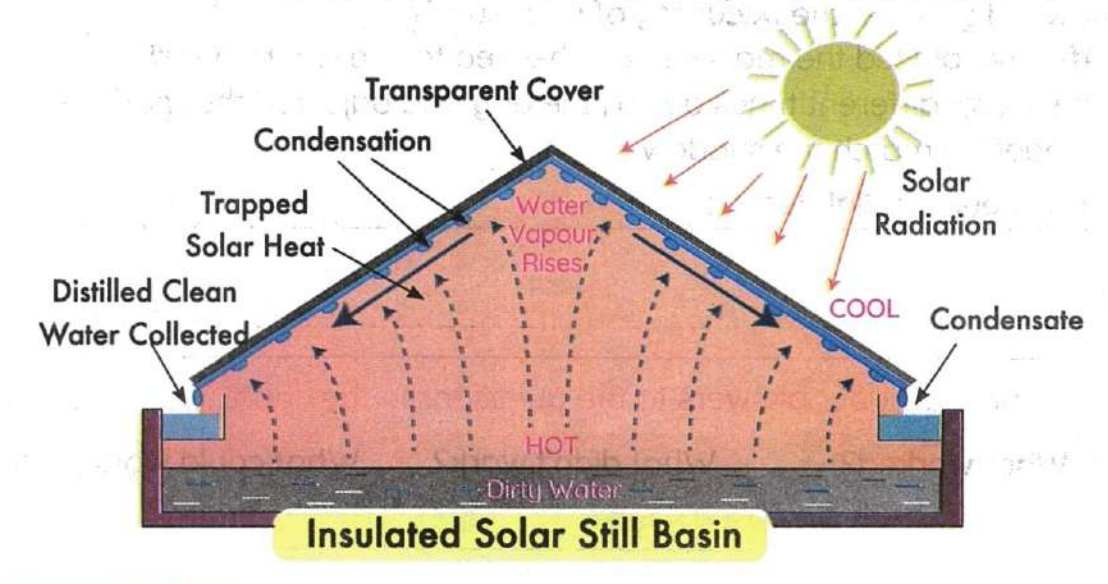
Desalination

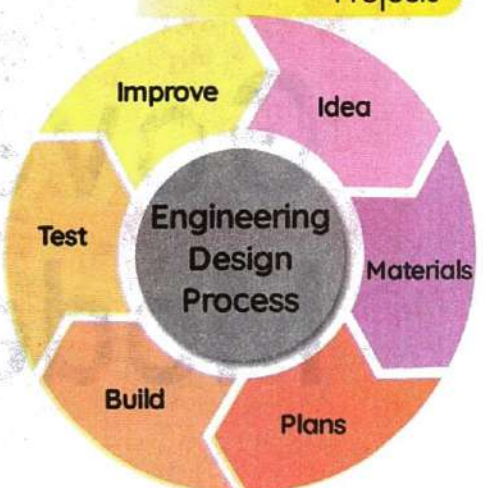
Desalination includes two processes, which are:

1 Evaporation	2 Condensation
Salt water is heated and evaporates, producing water vapor.	The water vapor produced was condensed and collected to produce fresh water.

» Scientists created a device known as a "solar still" that is used in the desalination process and uses solar energy to heat salty water.

• قام العلماء بتصميم جهاز يُسمى (المقطر الشمسي)؛ حيث يتم استخدم الطاقة الشمسية لتسخين المياه المالحة.





Tools:

- Salt water, 1 liter
- Plastic wrap
- Duct tape
- Mixing bowls
- Aluminum foil
- Rubber bands

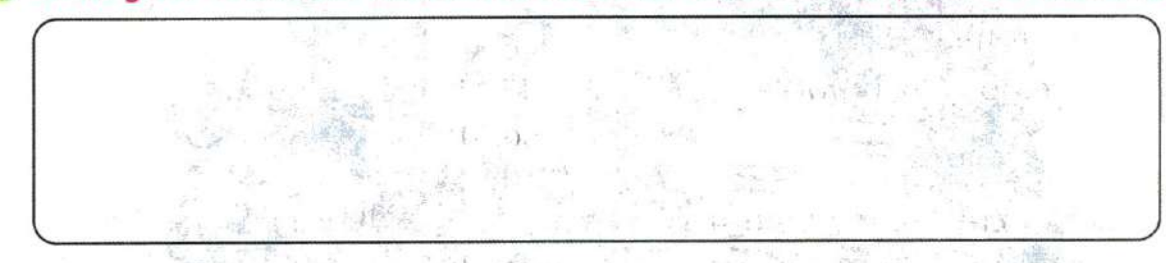
Three solar still sketches



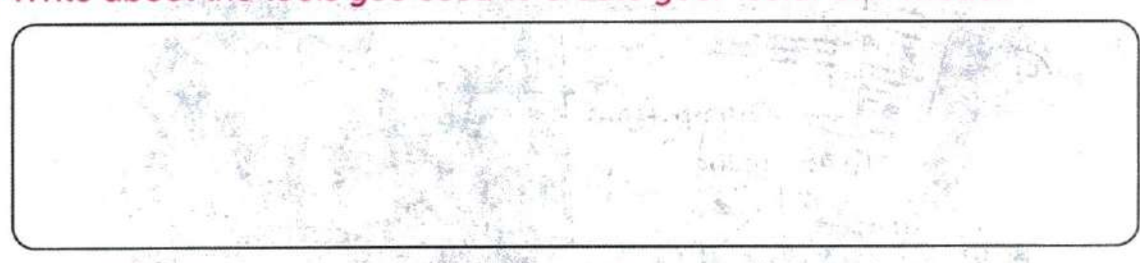




» Draw your "solar still" like one of the ones shown in the previous sketches:

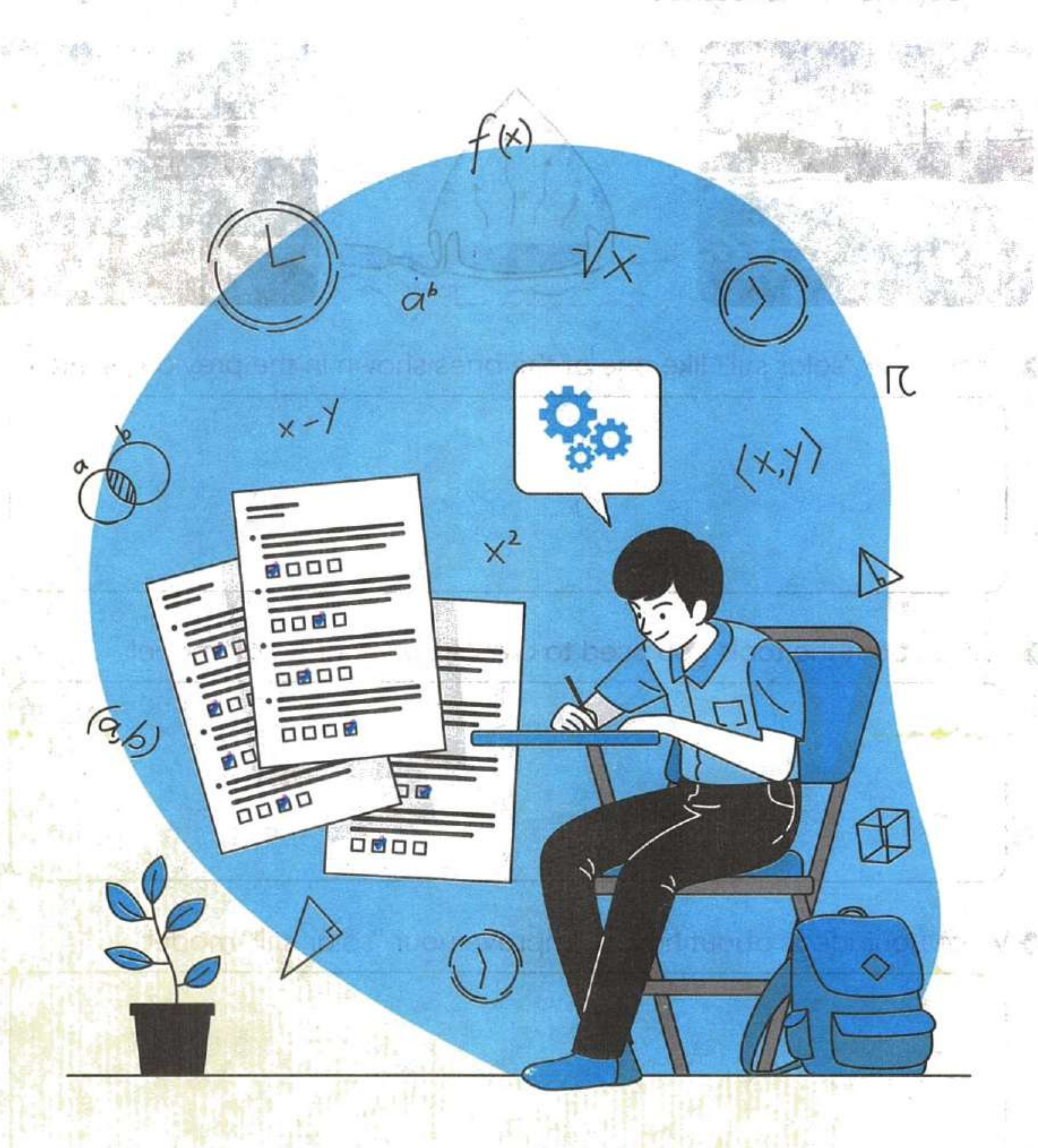


» Write about the tools you used to create your "solar still" model:



» Write your ideas about how to improve your "solar still" model:

Government Model Exams



1 Cairo – Heliopolis Administration

Question (1)

(A) Choose the correct answer:

1. Fresh water forms .... % of the water on Earth.
   a. 71 b. 96.5 c. 3.5 d. 50
2. Ponds and swamps are considered ....
   a. wetlands b. watersheds c. estuaries d. rivers
3. The revolution of moon around the Earth causes ....
   a. constellations b. rotation c. moon phases d. planets gravity
4. If the distance between the Earth and the moon increases, the gravity between them ....
   a. increases b. decreases c. disappears d. doesn't change

(B) Stars are large celestial bodies that consist of hot gases. What are these gases?

Question (2)

(A) Put (✓) or (✗):

1. Magnetism represents a pushing or pulling force. ( )
2. The extinction of frogs may happen because of the limited amount of salt water on Earth. ( )
3. The Earth revolves around the Sun once every 24 hours. ( )
4. The constellations help us to determine the main directions. ( )

(B) Give a reason for: Water affects nonliving things such as rocks.

Question (3)

(A) Complete the following sentences:

1. A/An .... is formed when the fresh water of a river meets the salt water of a sea.
2. .... is the fastest planet in the solar system that rotates around its axis.
3. .... force opposes the motion of the body and slows down its speed.
4. All .... belong to the biosphere

(B) What happens if: The Earth stops rotating around its axis?

2 Cairo - Madinet Nasr Administration

Question (1)

(A) Choose the correct answer:

1. .... are formed when water collects in low-lying areas.
   a. Suns b. Oceans c. Lakes d. Rivers
2. .... belong(s) to the geosphere.
   a. Grass b. Rocks c. Gases d. Bodies of water
3. .... is a factor that acts against gravity.
   a. Magnetism b. Mass of an object
   c. Air resistance d. Shape of an object
4. The shortest shadow of an object happens ....
   a. in the morning b. in the afternoon c. at noon d. at night

(B) Give a reason for: The Sun looks much larger to us than other stars.

Question (2)

(A) Put (✓) or (✗):

1. The Sun is necessary for the continuity of life on Earth. ( )
2. The force of a magnet is always attraction force only. ( )
3. Oceans are considered saltwater bodies. ( )
4. Fresh water forms about 3.5 % of the water on Earth. ( )

(B) What happens if: The mass of the moon decreases to half?

Question (3)

(A) Complete the following sentences using the words below:

(harmful - solar system - day and night - electricity)

1. The Sun is located at the center of the ....
2. The cycle of .... happens due to the Earth's rotation on its axis.
3. Water filters are used to remove .... materials from the polluted water.
4. In Aswan High Dam, water is used to generate ....

(B) Cross out the odd word:

Rivers - Oceans - Groundwater - Wetlands (............)

3 Cairo – Nozha Administration

Question (1)

(A) Choose the correct answer:

1. All the following are sources of water on Earth, except ....
   a. glaciers b. molten rocks c. groundwater d. ponds
2. The planets revolve around the Sun in fixed .... orbits.
   a. irregular b. triangular c. oval d. rectangular
3. Most of the heat and light energies of the Sun are produced due to the reaction between ....
   a. rocks and sand b. helium and sand
   c. hydrogen and rocks d. hydrogen and helium
4. Groundwater is present under the Earth's surface in rock and soil pores. This an interaction between the .... and the ....
   a. biosphere - atmosphere b. hydrosphere - biosphere
   c. geosphere - hydrosphere d. geosphere - atmosphere

(B) Give an example of: The gravity of Earth is greater than that of the moon.

Question (2)

(A) Put (✓) or (✗):

1. Oceans always contain fresh water. ( )
2. Living organisms belong to the biosphere. ( )
3. The air resistance force acts in the opposite direction of the gravity force. ( )
4. Sunlight can reach all areas on the Earth's surface at the same time. ( )

(B) What happens if: Earth does not rotate on its axis?

Question (3)

(A) Choose the correct answer:

1. To conserve water, we can .... the time of washing our hands. (increase – decrease)
2. What is the fastest planet that rotates on its axis? (Earth – Jupiter)
3. An area where the river meets the sea is a/an .... (lake – estuary)
4. .... is a wide space that contains celestial bodies such as stars, galaxies, comets, meteors, and satellites. (Constellation – Universe)

(B) Write the scientific term:

It contains the Sun and the eight planets revolving around it. (........)

4 Giza – Al Haram Administration

Question (1)

(A) Choose the correct answer:

1. .... belong(s) to the biosphere.
   a. Ice   b. Rocks   c. Animals
2. The amount of salt water on Earth is .... the amount of fresh water.
   a. larger than   b. smaller than   c. equal to
3. .... is attracted to the magnet.
   a. Iron   b. Wood   c. Glass
4. The Sun appears in the .... during the early morning.
   a. east   b. west   c. north

(B) Give reason for: The moon seems bright in the sky.

Because it .... the sunlight from the Sun.

Question (2)

(A) Put (✓) or (✗):

1. A lake is a body of water surrounded by land. (   )
2. There are no livings organisms in the hydrosphere. (   )
3. The stars are far away from Earth. (   )
4. The gravity of the moon affects the ocean tides. (   )

(B) Cross out the odd word: Friction - Magnetism - Moon - Air resistance

Question (3)

(A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Magnets	a. contain fresh water only.
2 Seas	b. attract metal objects.
3 Rivers	c. is the planet that rotates around itself every 24 hours.
4 Earth	d. contain salt water only.

(B) What happens to: The Earth if the gravity of the Sun disappears?

5 Giza – 6 October Administration

Question (1)

(A) Choose the correct answer:

1. Which of the following is part of the atmosphere?
   a. Oxygen b. Rocks c. Fish d. Dogs
2. Water is used for all the following purposes, except ....
   a. recreation b. burning c. bathing d. manufacturing
3. The gravity force depends on the .... of an object.
   a. mass b. temperature c. size d. color
4. The number of stars in the solar system is ....
   a. one b. eight c. nine d. two

(B) Give a reason for: The cycle of seasons occurs on Earth.

Question (2)

(A) Complete the following sentences using the words below:

(estuary - Jupiter - biosphere - 24 hours)

1. .... is the fastest planet during its rotation on its axis.
2. An .... is an area where the fresh water of a river meets the salt water of a sea.
3. .... is the time taken by Earth to complete one rotation on its axis.
4. The system that includes humans, animals, and plants on Earth is the ....

(B) Correct the underlined word:

The Earth orbits the Sun in <u>a rectangular</u> path. (........)

Question (3)

(A) Put (✓) or (✗):

1. Water on Earth is divided into fresh water and salt water. (   )
2. A river always flows from an area of low place to an area of high place. (   )
3. The Sun is located in the center of our galaxy. (   )
4. If the mass of the moon decreases, its gravity force will increase. (   )

(B) What happens if: A magnet is placed near some paper clips?

6 Giza – Atfih Administration

Question (1)

(A) Put (✓) or (✗):

1. A river always flows from an area of low place to an area of higher place. ( )
2. The ocean's floor may have mountains, plains, and plateaus. ( )
3. Dams can be used to filter polluted water. ( )
4. The change of an object's position is called force. ( )

(B) What happens if:

The distance between the moon and the Earth increases to twice?

Question (2)

(A) Choose the correct answer:

1. Cats and grass are parts of the ....
   [atmosphere - hydrosphere - biosphere - geosphere]
2. The Earth attracts objects towards ....
   [its center - the sky - the moon - the Sun]
3. Friction force .... the movement of objects.
   [slows down - increases - speeds up - doesn't affect]
4. The amount of salt water on the Earth is .... the amount of fresh water.
   [larger than- smaller than - equal to - half]

(B) Cross out the odd word: Rivers - Rain - Gulfs - Groundwater

Question (3)

(A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Shallow areas of oceans	( ) a. is the center of the solar system.
2 The Sun	( ) b. are formed when water is collected in low-lying areas.
3 Lakes	( ) c. the Earth.
4 Gravity keeps the moon in an orbit around	( ) d. contain coral reefs.

(B) Give a reason for: Most of the fresh water on Earth can't be used for drinking.

7 Qualyobia – Khanka Administration

Question (1)

(A) Choose the correct answer:

1. 96.5% of the Earth's water is .... water. (salt - sugar - fresh - frozen)
2. Which of the following is part of the geosphere?
   (Rocks - Clouds - Water - Animals)
3. .... are formed when water is collected in low-lying areas.
   (Seas - Lakes - Rivers - Oceans)
4. The Earth attracts the objects towards ....
   (the sky - its center - the moon - the Sun)

(B) Cross out the odd word: Rivers - Rain - Groundwater - Oceans

Question (2)

(A) Put (✓) or (✗):

1. The magnet can exert a pulling force only. ( )
2. The Earth takes 12 hours to make one rotation on its axis. ( )
3. Water occupies three-quarters of the Earth's surface. ( )
4. Lakes, oceans and rivers are included in the hydrosphere. ( )

(B) What happens if: The river water meets the sea water?

Question (3)

(A) Complete the following sentences using the words below:

(Solar system - Force - Biosphere - Watershed)

1. .... is the system that includes all living organisms on the Earth.
2. .... is an area of land where water from different sources flows towards a common location.
3. .... contains the Sun and the eight planets revolving around it.
4. .... is a pull or push that is applied to an object.

(B) Give a reason for:

The moon is attracted to the Earth.

8 Alexandria – East Zone

Question (1)

(A) Choose the correct answer:

1. Rainwater is part of the ....
   a. biosphere b. geosphere c. hydrosphere d. atmosphere
2. Gravity keeps the moon in an orbit around ....
   a. the Sun b. the Earth c. itself d. another moon
3. .... is considered a type of friction force.
   a. Air resistance b. Magnetism c. Gravity d. Electrical force
4. Rocks are broken down into smaller particles during .... process.
   a. photosynthesis b. weathering c. erosion d. respiration

(B) Correct the underlined word:

The Sun is a <u>planet</u> that can give out light. (............)

Question (2)

(A) Complete the following sentences from the list below:

(shortest - estuary - the Sun - magnetism)

1. When a river meets a sea, an .... is formed.
2. The force between two magnets is called ....
3. The solar system includes .... at its center and eight planets around it.
4. At noon, the Sun forms the .... shadows of objects.

(B) Give a reason for:

- We should turn off the water while brushing our teeth.

Question (3)

(A) Put (✓) or (✗):

1. Water on Earth is divided into fresh water and salt water. ( )
2. Constellations have similar shapes in the sky. ( )
3. The Sun revolves around the Earth. ( )
4. Oceans are considered saltwater bodies. ( )

(B) Write the scientific term:

It is a force that pulls the objects down towards the Earth's surface.

(............)

9 Alexandria – Montazah Zone

Question (1)

(A) Complete the following sentences using the words below:

(pulling - fresh water - Earth - biosphere)

1. .... revolves around the Sun in a fixed orbit.
2. All living organisms belong to the ....
3. The force of gravity is always a .... force.
4. We must take a quick shower to conserve ....

(B) Correct the underlined word:

Oxygen in the air is part of the <u>geosphere</u>.

Question (2)

(A) Write the scientific term:

1. It is an imaginary line between the North Pole and the South Pole of Earth. (....................)
2. It is the type of water that forms about 96.5% of Earth. (....................)
3. It is an invisible force that attracts metal objects to the magnet. (....................)
4. They are bodies of water surrounded by land. (....................)

(B) Cross out the odd word:

Rivers - Oceans - Seas - Lake Assal

Question (3)

(A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Solar system	a. is the force that opposes the motion of a body.
2 Friction	b. contains the Sun, moons, and planets.
3 Hydrosphere	c. is formed when a river meets a sea.
4 Estuary	d. contains fresh water and salt water.

(B) Give a reason for: The cycle of four seasons occurs.

10 Alexandria – Middle Zone

Question (1)

(A) Put (✓) or (✗):

1. The moon and stars make their own light. ( )
2. Lakes are large areas of water surrounded by land. ( )
3. A river always flows from an area of low place to an area of higher place. ( )
4. The Earth's gravity keeps all planets in their orbits. ( )

(B) Cross out the odd word: Oxygen - Nitrogen - Water - Carbon dioxide

Question (2)

(A) Complete the following sentences using the words below:

(Molten rooks - rocks - east - force - wetland)

1. The land that is partially covered with water is called a ....
2. The Sun appears in the .... direction in the early morning.
3. .... and .... are parts of the geosphere.
4. The object at rest needs a .... to move

(B) Write the scientific term:

It is an area where the fresh water of a river meets the salty water of a sea. (..........)

Question (3)

(A) Choose the correct answer:

1. The basic liquid matter which is needed by humans, animals, and plants is ....
   a. milk b. water c. oil d. alcohol
2. The day and night cycle occurs due to the rotation of Earth around ....
   a. the Sun b. its axis c. the moon d. the solar system
3. All the following are components of the atmosphere, except ....
   a. oxygen gas b. nitrogen gas c. metals d. water vapor
4. Gravity keeps the moon in an orbit around ....
   a. the Sun b. the Earth c. itself d. another moon

(B) Give a reason for: Water can affect nonliving things.

11 Suez – South Suez Administration

Question (1)

(A) Choose the correct answer:

1. Water covers nearly .... of the Earth's surface.
   a. $\frac{1}{2}$ b. $\frac{3}{4}$ c. $\frac{1}{5}$ d. $\frac{1}{4}$
2. The large sheets of ice or snow that moves slowly over the Earth's surface are called ....
   a. minerals b. glaciers c. rocks d. biosphere
3. The Earth's orbit is not perfectly ....
   a. vertical b. horizontal c. circular d. real
4. Constellations appear .... in the sky during the year.
   a. at different positions b. at the same position
   c. in winter only d. in summer only

(B) Give a reason for: The moon is attracted to Earth.

Question (2)

(A) Correct the underlined words:

1. The Sun is a planet that can give out light. (........)
2. The nitrogen in air is part of the geosphere. (........)
3. The Earth orbits the Sun in a rectangular path. (........)
4. When water freezes, it changes to water vapor. (........)

(B) Mention one fresh body of water and another salty one.

....

Question (3)

(A) Complete the following sentences using the words below:

(hydrogen - Dolphins - force - estuary)

1. .... live in salt water
2. Most of the heat and light energies of the Sun are produced due to the reaction between .... and helium.
3. When a river meets a sea, an .... is formed.
4. Objects at rest need a .... to move.

(B) What happens when: The Earth rotates on its axis?

12 Behaira – Rashid Administration

Question (1)

(A) Choose the correct answer:

1. .... is/are part of the biosphere. (Water - Clouds - Animals)
2. .... are formed when water is collected in low-lying areas. (Seas - Lakes - Rivers)
3. The center of the solar system is the .... (Sun - Earth - moon)
4. The force that causes skydivers to move downward is called .... (gravity of Earth - gravity of the moon - gravity of the Sun)

(B) What happens to: The planets if the Sun has no gravity?

Question (2)

(A) Complete the following sentence:

1. In the solar system all planets revolves in fixed paths called ....
2. .... is the system including all layers of earth, earth crust, mantle, inner and outer core.
3. The wide space that contains celestial object is called ....
4. Earth rotates around itself every .... hours

(B) Give a reason for: There is no fish or aquatic animals living in Assal lake.

Question (3)

(A) Put (✓) or (✗):

1. Galileo binoculars help scientists see distant objects in space with more details. (   )
2. A watershed is an area where water from one source only flows towards a specific location. (   )
3. Air resistance is a type of friction force that can be seen easily. (   )
4. Earth's systems are divided to three systems: atmosphere, biosphere and hydrosphere. (   )

(B) Look at the opposite figure, then complete:

1. .... has the largest mass.
2. .... has the lowest force of gravity.

Sun
Earth
Moon

13 Menofia – El-Bagour Administration

Question (1)

(A) Choose the correct answer:

1. Gravity keeps the moon in an orbit around ....
   a. the sun b. the Earth c. itself d. another moon
2. Crayfish can live in ....
   a. lakes b. oceans c. streams d. ponds
3. .... are formed when water is collected in low-laying areas.
   a. Seas b. Lakes c. Oceans d. Rivers
4. Coral reefs are found in ....
   a. frozen areas b. abyssal zones c. fresh water d. shallow areas

(B) Give a reason for: A paper clip is pulled towards the magnet.

Question (2)

(A) Put (✓) or (✗):

1. The orbit of each planet has an ellipse shape. ( )
2. The Sun appears in the same place in the sky all day. ( )
3. The length of day and night are always equal during the whole year. ( )
4. Stars are made up of hot gases. ( )

(B) What happens to: The speed of a skydiver when he opens his parachute during landing?

Question (3)

(A) Write the scientific term:

1. It is the water that is stored in the cracks and spaces between underground rocks. (............)
2. It is a celestial body that orbits around the Earth. (............)
3. It is the imaginary line that passes through the two poles of Earth. (............)

(B) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. The word "geo" refers to	a. water.
2. The word "hydro" refers to	b. the Earth.
3. The word "atmo" refers to	c. life.
4. The word "bio" refers to	d. vapor.

14 Sharkia – El-Zakazek Administration

Question (1)

(A) Choose the correct answer:

1. The number of Earth's layers that form the geosphere is ....
   a. three   b. four   c. six   d. eight
2. .... is/are part(s) of the atmosphere.
   a. Oxygen   b. Rocks   c. Fish   d. Dogs
3. The solar system includes ....
   a. the moon only   b. the planets only
   c. the Sun and planets   d. the stars and galaxies
4. The Earth revolves around the Sun once every ....
   a. 12 hours   b. 24 hours   c. two years   d. one year

(B) Give a reason for: The gravity of the Earth is greater than the gravity of the moon.

Question (2)

(A) Put (✓) or (✗):

1. Dolphins live in ponds and lakes. (   )
2. The water in streams is fresh and running. (   )
3. The parachute helps in increasing the speed of the object falling to the ground. (   )
4. Stars are superhot gaseous spheres; most of them are helium and hydrogen. (   )

(B) Complete the following:

We see the moon bright in the sky because it .... the sunlight.

Question (3)

(A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Oceans	a. attract iron nails.
2 Estuaries	b. contain salt water only.
3 Magnets	c. is a medium-sized star.
4 The Sun	d. contain a mixture of fresh and salt water.

(B) What happens when: Earth spins (rotates) on its axis?

15 Aswan – Educational Zone

Question (1)

(A) Choose the correct answer:

1. The amount of salt water on Earth is .... the amount of fresh water.
   a. larger than b. smaller than c. equal to d. no correct answer
2. The presence of dolphins in oceans represents an interaction between the .... and the ....
   a. biosphere - hydrosphere b. biosphere - geosphere
   c. hydrosphere - atmosphere d. hydrosphere - geosphere
3. We can see more .... in the sky at night than during the day.
   a. moons b. stars c. planets d. satellites
4. The force of .... keeps the planets on their paths around the Sun.
   a. air resistance b. friction c. gravity d. electricity

(B) Give a reason for: The gravity of the Earth is greater than the gravity of the moon.

Question (2)

(A) Complete the following sentences using the words below:

(fresh – east – death – sets – galaxy)

1. When a group of stars, planets and gases are held together by gravity, they form a ....
2. The poor quality of water leads to the extinction of some organisms or causes .... to others.
3. The Sun rises in the .... and .... in the west.
4. Rivers and most lakes contain .... water.

(B) Give a reason for: The skydiver lands safely when be open his parachute.

Question (3)

(A) Put (✓) or (✗):

1. The gravitational force of an object decreases as its mass increases. ( )
2. The magnet attracts objects made of plastic. ( )
3. Day and night phenomenon occurs due to the revolution of Earth around the Sun. ( )
4. Crayfish live in ponds, while frogs live in streams. ( )

(B) What happens to: A tree's shadow at noon?

Model Answers

Unit 3

Concept 1

Lesson 1

1
1. c 2. a 3. c 4. c
5. d 6. c 7. b 8. b
9. a 10. c 11. b 12. b
13. d 14. d

2
1. ✗ 2. ✓ 3. ✗ 4. ✓
5. ✗ 6. ✓ 7. ✗ 8. ✓
9. ✗

3
1. Atmosphere 2. Biosphere
3. Erosion 4. Weathering

4
1. water 2. gases
3. geosphere 4. biosphere
5. cleaning- bathing

5
1. blue 2. Water
3. state 4. geosphere
5. atmosphere 6. ice

6
1. Erosion 2. Water
3. Rocks

7
1. c 2. a 3. d 4. b

8
1. 4 2. 1 3. 2 4. 3
5. It freezes and turns into ice.

9
1. Because nearly three-quarters of the Earth's surface is covered with water.
2. Because water causes the weathering and erosion of rocks.
3. Because both plants and animals depend on water to survive.

10
1. It will evaporate and turn into water vapor.
2. All living organisms will die because they depend on the hydrosphere to survive.

Lesson 2

1
1. b 2. d 3. a 4. c
5. c 6. d 7. b 8. c
9. b

2
1. ✗ 2. ✗ 3. ✗ 4. ✗
5. ✗ 6. ✓ 7. ✗ 8. ✓
9. ✗

3
1. A river 2. A lake

4
1. water cycle. 2. condensates
3. Rain - biosphere 4. land

5
1. salt 2. atmosphere
3. hydrosphere

6
1. Rocks 2. Rain
3. Water

7
1. b 2. a 3. d 4. c

8
(A) 1. C 2. B 3. A 4. A
5. B

(B)

Biosphere	Hydrosphere	Atmosphere	Geosphere
Tree Snake Fish Bird Crocodile	Water	Oxygen	Rocks

9
1. Because plants need water to grow and survive.
2. Because plants produce seeds that can be replanted and grow forming new plants.
3. Because the water that belongs to the hydrosphere helps in transferring the small pieces of rocks that belong to the geosphere.
4. Due to the water cycle in which bodies of water evaporate, then condense and return back to the Earth's surface during rain.

Lesson 3

1
1. c 2. c 3. b 4. d
5. c 6. c 7. a 8. b
9. c 10. b 11. d 12. c

2
1. ✓ 2. ✓ 3. ✗ 4. ✗
5. ✓ 6. ✓ 7. ✓ 8. ✗
9. ✓ 10. ✓

3
1. Biome. 2. Geosphere
3. Atmosphere 4. Hydrosphere
5. Salt water 6. Biosphere

4
1. atmosphere 2. less
3. more
4. biosphere – geosphere

5
1. atmosphere 2. water
3. biosphere 4. fresh
5. hydrosphere

6
1. Desert 2. Gulf
3. Photosynthesis

7
(A) 1. b 2. a 3. d 4. c
(B) 1. b 2. a 3. d 4. c

8
1. fresh water 2. area (B)
3. hydrosphere 4. biosphere

9
1. Because the shape of the Earth is very close to be a sphere.
2. Because there is an interaction between water that belongs to the hydrosphere and rocks that belong to the geosphere.
3. Because most of the fresh water on Earth is found as glaciers.
4. Because plants take in carbon dioxide from the atmosphere and water from the soil, which belongs to the geosphere.
5. Because they are large areas characterized by similar soil, climate, and wildlife.

10
1. Most of the living organisms cannot survive.
2. The plants can't make photosynthesis process, so they will die.

Lesson 4

1
1. d 2. b 3. b 4. a
5. d 6. c 7. d

2
1. ✓ 2. ✗ 3. ✗ 4. ✓
5. ✗ 6. ✗ 7. ✓ 8. ✗
9. ✗

3
1. Salt water ecosystem
2. Intertidal zones 3. Coral reefs
4. Shallow areas

4
1. Saltwater 2. Freshwater
3. Intertidal zone
4. lake Nasser – ponds
5. Streams

5
1. intertidal 2. deep
3. summer
4. plants

6 1 Rivers 2 Oceans
3 Lake Nasser

7 1 b 2 a 3 d 4 c

8 1 ✗ 2 ✓ 3 ✗ 4 ✓
5 ✓ 6 ✗

9 1 Because they are very deep areas in the oceans.
2 Because it has a high concentration of natural salts.
3 Because some lakes dry up in the hot summer months.

10 1 They will disappear.
2 They can't survive and they will die.

Lesson 5

1 1 c 2 d 3 b 4 d
5 c 6 d 7 c

2 1 ✗ 2 ✗ 3 ✗ 4 ✗
5 ✗ 6 ✓ 7 ✓ 8 ✓

3 1 Water lilies 2 Ponds
3 Ocean currents

4 1 frogs - worms
2 still - running
3 flounder fish - dolphins

5 1 Catfish 2 Kelps

6

P.O.C	Salamanders	Caftish
Name of Aquatic Ecosystem	Ponds	Streams

7 1 (A) and (C) 2 (B)
3 (A), (C) and (D) 4 (D)

8 Because frogs live in still water of ponds, while catfish live in cold and running water of streams.

Model Exam 1

Question 1

(A) 1 c 2 a 3 c 4 a

(B) 1 Bathing
2 Cleaning

Question 2

(A) 1 ✗ 2 ✓ 3 ✗ 4 ✓

(B) Oceans

Question 3

(A) 1 b 2 d 3 a 4 c

(B) Because nearly three-quarters of the Earth is covered with water.

Model Exam 2

Question 1

(A) 1 b 2 b 3 c 4 b

(B) They can't survive.

Question 2

(A) 1 Intertidal zone 2 Water lily
3 Atmosphere 4 Groundwater

(B) Rivers

Question 3

(A) 1 larger 2 erosion
3 oceans
4 biosphere - geosphere

(B) Because plants produce seeds that can be replanted and grow forming new plants.

Unit 3

Concept 2

Lesson 1

1
1. b 2. c 3. d 4. b
5. d 6. c 7. a 8. a
9. b 10. c 11. b 12. d

2
1. ✗ 2. ✓ 3. ✗ 4. ✗
5. ✗ 6. ✓ 7. ✓ 8. ✓
9. ✓ 10. ✓ 11. ✓ 12. ✗

3
1. A lake 2. Groundwater
3. Wetland 4. Lake
5. Estuary 6. Oceans

4
1. fresh water 2. lakes
3. electricity 4. silver
5. more than
6. an ecosystem

5
1. wetlands 2. ocean's
3. an estuary 4. oceans

6
1. Seas 2. oceans

7
1. d 2. a 3. b 4. c

8
1. Fresh Water: Nile River - Amazon River
2. Salt Water : red sea - Atlantic ocean

9
a. 2 b. 3 c. 1

10
1. To conserve fresh water.
2. Because the amount fresh water is limited on Earth.
3. Because most of the water on Earth is salt water.
4. Because an estuary is formed where the fresh water of a river meets the salt water of an ocean or a sea.

11
1. A lake is formed.
2. An estuary is formed.

Lesson 2

1
1. b 2. d 3. a 4. c
5. b

2
1. ✗ 2. ✗ 3. ✓ 4. ✓
5. ✗ 6. ✗ 7. ✓ 8. ✓

3
1. Watershed 2. Dam

4
1. death 2. floods
3. dams
4. poor quality - scarcity

5
1. Scarcity 2. fresh

6
1. b 2. a 3. d 4. c

7
1. a watershed
2. area "B" to area "A"
3. a lake

8
1. Because it leads to the death or extinction of many living organisms.
2. Due to the poor quality of the fresh water.
3. Due to drought and scarcity of water.
4. To store and control fresh water.
5. Because it makes the water level of the river rise causing flooding.

9
1. Many living organisms will die or go extinct.
2. It will cause floods.
3. The stream may dry up.

Lesson 3

1
1. d 2. b 3. c 4. b
5. b 6. a 7. b

2
1. ✗ 2. ✗ 3. ✗ 4. ✓
5. ✗ 6. ✗

3
1. Tributaries
2. Watershed maps

4
1. upstream – downstream
2. tributary – wind
3. factory – dam

5
1. ✓ 2. ✗ 3. ✓ 4. ✓
5. ✓

6
1. Because all bodies of water are connected together.
2. Because the waste of the farm leaks into the water of the river causing its pollution.

7
1. The stream's water will carry the waste of the factory to the river causing water pollution.
2. The dam will hold the water behind the river, so the water level in the sea will be affected.
3. Litter will be blown into the water of the tributary, then into the river's water, causing water pollution.

Lesson 4

1
1. a 2. b 3. c 4. d
5. c 6. c 7. b 8. d
9. c 10. d 11. d

2
1. ✓ 2. ✓ 3. ✗ 4. ✗
5. ✗ 6. ✓ 7. ✓ 8. ✓
9. ✓ 10. ✗ 11. ✗

3
1. Preservation of resources
2. Sustainability of resources
3. Cutting down trees
4. Overfishing

4
1. preservation
2. deforestation – soil erosion
3. decreasing
4. undrinkable
5. dry up

5
1. trees
2. preservation
3. preservation
4. erosion
5. decrease

6
1. e 2. d 3. b 4. a
5. c

7
1. b 2. c 3. c 4. a
5. b

8
1. A 2. B 3. A

9
1. To preserve the natural resources.
2. Because it leads to soil pollution and the death of animals and plants.
3. Because it leads to deforestation and soil erosion.
4. Because the fish numbers will decrease and become rare.

10 1 It will cause deforestation
2 It will cause soil pollution.
3 The grass will disappear in these areas and cows will be hungry.
4 The water becomes undrinkable.

Lesson 5

1 1 c 2 d 3 c 4 b
5 a 6 a 7 c 8 b

2 1 ✗ 2 ✓ 3 ✗ 4 ✗
5 ✗ 6 ✓ 7 ✗ 8 ✓

3 1 Recycling water 2 Water filter
3 Waste water
4 Wastewater engineers

4 1 polluted 2 water filter
3 wastewater engineers
4 test – rivers 5 floods

5 1 c 2 a 3 d 4 b

6 1 Water filter model
2 **A.** Dirty water **B.** Sand
C. Charcoal **D.** Cotton balls
E. Fresh water
3 It helps us remove harmful materials from polluted water.
4 Recycling wastewater

7 1 To recycle it by removing harmful materials to reuse it.
2 To make sure it is safe to use.

8 The water becomes polluted.

Model Exam 1

Question 1
(A) 1 c 2 b 3 b 4 a
(B) It will lead to the death or extinction of many living organisms, such as fish and amphibians.

Question 2
(A) 1 ✓ 2 ✗ 3 ✗ 4 ✓
(B) To conserve fresh water.

Question 3
(A) 1 Sustainability 2 Wetland
3 Wastewater engineers
4 Tributaries
(B) ocean's

Model Exam 2

Question 1
(A) 1 d 2 b 3 a 4 d
(B) renewable

Question 2
(A) 1 ✗ 2 ✓ 3 ✓ 4 ✓
(B) The factory waste leaks into the river's water, causing its pollution.

Question 3
(A) 1 dams 2 deforestation
3 water filter 4 sustainability
(B) Because it leads to soil pollution and the death of animals and plants.

School Book
Assess Your Learning on Unit 3

1 d 2 c 3 a 4 d
5 b 6 c 7 c 8 a
9 b 10 d 11 c 12 c
13 b 14 b

Unit 4

Concept 1

Lesson 1

1
1. b 2. c 3. d 4. b
5. a 6. b 7. c

2
1. ✓ 2. ✗ 3. ✓ 4. ✓
5. ✗ 6. ✗

3
1. Gravity 2. Gravity
3. Moon

4
1. Earth's gravity - orbit
2. the Sun 3. center
4. pulling

5
1. b 2. c 3. a

6
1. Due to the Earth's gravity that pulls the pen downward.
2. Due to the Earth's gravity.

7
1. He will be pulled downward due to the Earth's gravity.
2. The moon would float off into space.

Lesson 2

1
1. d 2. b 3. a 4. b
5. b 6. c 7. c 8. b
9. a 10. d 11. b

2
1. ✗ 2. ✗ 3. ✓ 4. ✗
5. ✓ 6. ✓ 7. ✓ 8. ✗
9. ✗

3
1. Force 2. Motion
3. Force 4. Magnetism
5. Magnetism 6. Magnetism

4
1. more 2. push

5
1. less 2. more
3. Force
4. Gravity - magnetism
5. paper clips

6
1. b 2. c 3. d 4. e
5. a

7
(B) Because it has the smallest mass.

8
1. magnetism 2. push

9
1. As the distance between two objects increases, the gravity between them decreases and vice versa.
2. Because the magnet exerts a pull force on them called magnetism.

10
1. The gravity between Earth and moon decreases, and the moon may float off into space.
2. The gravity between Earth and the moon decreases, and the moon may float off into space.
3. Paper clips are pulled toward the magnet.
4. The blades of the wind turbine will move.

Lesson 3

1
1. b 2. c 3. b 4. b
5. d 6. b 7. a 8. b
9. d 10. c

2
1. ✓ 2. ✗ 3. ✗ 4. ✗
5. ✗ 6. ✓ 7. ✓ 8. ✗
9. ✓ 10. ✗ 11. ✗

3
1. Gravity 2. The Sun

4
1. space 2. more
3. Sun's gravity 4. direction
5. center 6. mass

5 (1) b (2) c (3) a

6 (1) The Sun (2) The moon

7 (1) ✗ (2) ✗ (3) ✗ (4) ✓

8 (1) ✓ (2) ✗ (3) ✗

9 1 and 2

10 (1) 90° - gravity (2) 80 ° (3) 110°

11 (1) Due to the absence of the gravity.
(2) Due to the gravity that pulls the ball down towards the Earth.
(3) Because the mass of the Earth is greater than the mass of the moon.

12 (1) It will fall down towards the Earth's surface.
(2) Everything on Earth will float off into space.
(3) All the planets will float off in the space.

Lesson 4

1 (1) d (2) c (3) d (4) a
(5) a (6) c (7) a (8) c
(9) b (10) c (11) d (12) d
(13) d (14) c (15) b

2 (1) ✓ (2) ✗ (3) ✓ (4) ✓
(5) ✗ (6) ✗ (7) ✗ (8) ✗
(9) ✗ (10) ✗ (11) ✓ (12) ✗
(13) ✓ (14) ✓ (15) ✓ (16) ✓

3 (1) Gravity (2) Magnetism
(3) Friction force (4) Air resistance
(5) Gravity (6) Parachute

4 (1) slows down (2) Magnetism
(3) Air resistance (4) Air resistance

5 (1) brakes – friction (2) an opposite
(3) pulls – slows down
(4) gravity (5) magnetism

6 (1) c (2) e (3) a (4) b
(5) d

7 (1) A paper clip, because the feather is affected by more air resistance than the feather.
(2) A metallic ball, because it has more mass so it is affected by less air resistance than the wooden one.
(3) A crumpled paper, because it is affected by less air resistance than the flat one.

8 (1) ✓ (2) ✗

9 (1) ✗ (2) ✓ (3) ✓

10 (1) ✓ (2) ✓ (3) ✓

11 (1) Figure (2) (2) 8

12 (1) Due to the Earth's gravity that keeps atmosphere around Earth.
(2) Because the magnet has a force known as magnetism that can attract paper clips.
(3) Due to the friction force that slows down the bike movement.
(4) Because the air resistance slows down the skydiver's speed.
(5) Because the air resistance that pulls the skydiver backward acts against the gravity.
(6) Because the feather is affected by more air resistance than the paper clip.

13
1. The iron nails will be attracted to the magnet.
2. Everything on Earth will float off into space.
3. The moon will attract the Earth toward it.
4. The bike slows down till it stops due to the friction force.
5. The speed of his drop will decrease due to air resistance.
6. The stone will reach the ground first.
7. They will reach the surface at the same time.
8. They will reach the surface at the same time.

Lesson 5

1
1. a 2. d 3. b 4. b
5. b

2
1. ✗ 2. ✓ 3. ✗ 4. ✗
5. ✗ 6. ✓ 7. ✗

3
1. The Sun
2. The gravitational force
3. Orbit
4. The solar system

4
1. Sun
2. the solar system
3. an ellipse 4. an orbit

5
1. Because the great gravitational pulling force of the Sun keeps the planets revolving in fixed orbits.
2. Because of the great gravitational pulling force of the Sun.

6 All planets would float off into space.

Model Exam 1

Question 1

(A) 1. a 2. a 3. a 4. b

(B) They will reach the Earth's surface at the same time.

Question 2

(A) 1. c 2. d 3. b 4. a

(B) Because the Earth's mass is greater than the moon's mass.

Question 3

(A) 1. ✗ 2. ✓ 3. ✗ 4. ✓

(B) Friction force

Model Exam 2

Question 1

(A) 1. d 2. c 3. a 4. b

(B) The moon

Question 2

(A) 1. ✗ 2. ✓ 3. ✓ 4. ✓

(B) The attraction force between them decreases, and the moon might float off into space.

Question 3

(A) 1. opposite 2. Sun's
3. gravity 4. a force

(B) 1. The Sun 2. The moon

Unit 4

Concept 2

Lesson 1

1
1. a 2. b 3. c 4. b
5. c 6. c 7. b 8. b
9. d 10. a

2
1. ✗ 2. ✓ 3. ✓ 4. ✗
5. ✗ 6. ✗ 7. ✗ 8. ✗
9. ✓ 10. ✗

3
1. Day and night 2. Earth's axis
3. 24 hours 4. Day
5. Night

4
1. day – night 2. middle
3. east - west 4. rotates – axis

5
1. d 2. a 3. b 4. c

6
1. A 2. B

7
(b)

8
1. ✓ 2. ✗ 3. ✓ 4. ✗

9
1. Due to the Earth's rotation on its axis.
2. Due to the Earth's rotation on its axis.

10
1. The cycle of day and night will happen.
2. The cycle of day and night won't happen.
3. This part of Earth will have day.

Lesson 2

1
1. c 2. a 3. c 4. a
5. c 6. a 7. b 8. d
9. d 10. d 11. a

2
1. ✗ 2. ✓ 3. ✗ 4. ✗
5. ✓ 6. ✗ 7. ✗ 8. ✗
9. ✗ 10. ✗ 11. ✗

3
1. Cycle
2. Counterclockwise
3. Orbits 4. Jupiter
5. Seasons' cycle
6. The solar system

4
1. counterclockwise
2. on its axis 3. different
4. an elliptical 5. solar system
6. 24

5
1. seasons cycle 2. tilt
3. west – east
4. axis – 24 hours 5. sun

6
1. d 2. a 3. b 4. c

7
1. b 2. c 3. b

8
1. Due to the Earth's revolution around the Sun every year.
2. Due to the Earth's elliptical orbit and the tilt of Earth on its axis.
3. Because Jupiter rotates on its axis faster than Earth.

9
1. The cycle of day and night will not happen.
2. The Sun appears to move at same speed in the sky and time of sunrise and sunset will be the same every day.
3. The sun will rise from west and set in the east.
4. The day length on Earth will be equal to that on Jupiter.

Lesson 3

1
1. d 2. b 3. c 4. b
5. c 6. d 7. c 8. d
9. b 10. a 11. b

2 1 ✓ 2 ✗ 3 ✗ 4 ✓ 5 ✗ 6 ✓ 7 ✗ 8 ✗ 9 ✗ 10 ✓ 11 ✗

3 Constellation

4
1. longer
2. amount of sunlight - position of the sun
3. pattern
4. shortest
5. east

5 1 d 2 a 3 b 4 c

6 1 c 2 c

7 1 ✓ 2 ✗ 3 ✗ 4 ✓

8
1. Because we are moving with the same speed of the Earth's rotation.
2. Due to the change of Sun's position in the sky and the amount of sunlight reaching the Earth through the year.
3. Due to the Earth's rotation around its axis.
4. Due to the Earth's revolution around the Sun.
5. Due to the Earth's rotation around its axis.

9
1. The length and angle of shadows will not change through the day.
2. The length of the shadow during the morning will be longer than that during at noon.

Lesson 4

1 1 c 2 b 3 d 4 d 5 c 6 b 7 d 8 c 9 d 10 c

2 1 ✗ 2 ✓ 3 ✗ 4 ✓ 5 ✗ 6 ✓ 7 ✗ 8 ✓ 9 ✗ 10 ✓ 11 ✓ 12 ✓ 13 ✗

3
1. Stars
2. Lunar month
3. Full Moon
4. New Moon
5. The moon

4
1. edge
2. Sun
3. quarter
4. right

5
1. hot gases
2. moon - planets
3. reflects
4. beginning
5. Full Moon

6 1 b 2 a 3 c

7 1 ✓ 2 ✗ 3 ✓ 4 ✗

8
1. Because stars are made of hot gases.
2. Because the moon reflects the sunlight falling on it.
3. due to the moon's revolution around Earth and the Earth's revolution around Sun.

9
1. The moon won't appear bright at night sky.
2. The moon appears fully darkened as it goes by the new moon phase.

Lessons 5 and 6

1 1 a 2 c 3 d 4 a 5 b 6 d 7 d 8 c 9 b

2 1 ✗ 2 ✓ 3 ✓ 4 ✓ 5 ✓ 6 ✗ 7 ✗ 8 ✓ 9 ✓ 10 ✗ 11 ✓

3
1. Stars
2. Galaxy
3. Universe
4. Planetarium directors
5. Copernicus
6. The Sun
7. Planetarium

4
1. more
2. medium-sized
3. Sun
4. telescopes

5
1. heat – light – hydrogen
2. Binoculars
3. Copernicus – Sun
4. projector

6
1. Moon
2. Sun

7
1. e
2. a
3. b
4. c
5. d

8
1. ✓
2. ✗
3. ✗
4. ✓
5. ✗
6. ✗

9
1. planetarium
2. planets
3. dome

10
1. Because the Sun is the nearest star to Earth while other stars are farther away.
2. Because the Sun provides the Earth with heat and light.
3. Due to the burning of helium and hydrogen gases that form these stars.
4. Due to the presence of the atmosphere that allows some light waves pass through and blocks the other.

11 It gives off light and heat.

Model Exam 1

Question 1
(A) 1. c 2. a 3. b 4. d

(B) Galaxy

Question 2
(A) 1. ✗ 2. ✓ 3. ✓ 4. ✗

(B) Due to the revolution of the moon around the Earth.

Question 3
(A) 1. different 2. star 3. Full Moon 4. Jupiter

(B) Because we rotate with it with the same speed of Earth's rotation..

Model Exam 2

Question 1
(A) 1. d 2. d 3. d 4. c

(B) Moon

Question 2
(A) 1. d 2. a 3. b 4. c

(B) Copernicus

Question 3
(A) 1. ✗ 2. ✗ 3. ✗ 4. ✓

(B) Day and night cycle will occur.

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1. a
2. a
3. c
4. a
5. b
6. d
7. b
8. a
9. d
10. a
11. a
12. c
13. a
14. a

Final Revision Model Answers

Unit 3

Concept 1

1
1. c 2. b 3. b 4. b
5. b 6. b 7. a 8. b
9. b 10. c 11. d 12. c
13. c 14. a 15. b 16. c
17. c 18. d

2
1. ✗ 2. ✗ 3. ✗ 4. ✓
5. ✗ 6. ✗ 7. ✗ 8. ✓
9. ✓ 10. ✗ 11. ✓ 12. ✓
13. ✗ 14. ✓

3
1. Atmosphere 2. Biosphere
3. Geosphere 4. Hydrosphere
5. Ocean
6. Intertidal zone 7. Biome
8. Salt water 9. Weathering
10. Erosion 11. Groundwater

4
1. atmosphere 2. bacteria
3. wind 4. evaporates
5. fresh 6. hydrosphere
7. Deep 8. summer

5
(A) 1. dolphins , flounder fish
2. Frogs, hydrosphere
3. atmosphere

(B) 1. less 2. hydrosphere
3. summer 4. biosphere
5. evaporates, condensates

6
1. Erosion 2. Human
3. Rocks 4. Space
5. Nile river 6. Kelps

7
(A) 1. c 2. a 3. d 4. b
(B) 1. b 2. a 3. d 4. c

8
1. D 2. B 3. A 4. C

9
1. C 2. B 3. A 4. A

10
1. fresh water 2. area (B)
3. hydrosphere 4. biosphere

11
1. ✗ 2. ✓ 3. ✗ 4. ✓
5. ✓ 6. ✗

12
1. C 2. D 3. A 4. B
5. A , C

13
1. Because water causes the weathering and erosion of rocks.
2. Because a human belongs to the biosphere, while oxygen belongs to the atmosphere.
3. Because most of water on Earth is salt water.
4. Because plants absorb water that is part of the hydrosphere, and they absorb carbon dioxide from atmosphere.
5. Because there's no sunlight can reach abyssal zones.
6. Because it has a high concentration of natural salts.
7. Because frogs live in still water, while catfish live in cold and fast running water.

14
1. All living organisms would die, because they depend on water to survive.
2. They can't survive.

Unit 3

Concept 2

1
1. c 2. a 3. a 4. d
5. b 6. a 7. b 8. a
9. d 10. b 11. b 12. b
13. d 14. c 15. a 16. c
17. d 18. c 19. a

2
1. ✓ 2. ✓ 3. ✓ 4. ✗
5. ✗ 6. ✗ 7. ✗ 8. ✗
9. ✗ 10. ✓ 11. ✓ 12. ✗
13. ✗ 14. ✓ 15. ✓ 16. ✗
17. ✗ 18. ✗ 19. ✗ 20. ✗
21. ✗

3
1. Groundwater 2. Wetland
3. Estuary 4. Oceans
5. Dam
6. Watershed maps
7. Preservation of resources
8. Sustainability of resources
9. Overfishing 10. Recycling
11. Wastewater

4
1. oceans 2. decrease
3. dams 4. increase
5. imbalance 6. fresh water
7. sand

5
(A) 1. fresh water 2. lakes
3. electricity 4. more than
5. ecosystems

(B) 1. death 2. upstream
3. tributary, wind
4. factory, dam

(C) 1. preservation
2. undrinkable 3. dry up
4. Water filters
5. Wastewater engineers

6
1. Oceans 2. Ocean
3. Oil

7
(A) 1. d 2. a 3. b 4. c
(B) 1. d 2. a 3. c 4. e
5. b

8
1. (2) 2. (3) 3. (1)

9
1. ✓ 2. ✗ 3. ✗ 4. ✓
5. ✗

10
1. Water filter model
2. **A.** Dirty water **B.** Sand
C. Charcoal **D.** Cotton balls
E. Filtered water
3. Recycling wastewater and removing waste materials from it.
4. Recycling water

11
1. To conserve fresh water.
2. Due to the poor quality of fresh water.
3. Because the poor quality of water causes death and extinction of living organisms living in water ecosystems.
4. To preserve natural resources.

12
1. A lake is formed.
2. An estuary is formed.
3. Living organisms in the ponds might die or be extinct.
4. The water level of the river rises, which causes floods.
5. The wastes of the factory leak into the water of the river, causing pollution.
6. The grass will disappear.
7. The water will be polluted and become undrinkable.
8. To check if it is safe to be used by humans.

Unit 4

Concept 1

1

1 b	2 a	3 c	4 c
5 c	6 b	7 b	8 d
9 c	10 b	11 d	12 a
13 c	14 d	15 a	16 a
17 c	18 c	19 b	20 c

2

1 ✗	2 ✓	3 ✓	4 ✗
5 ✓	6 ✓	7 ✗	8 ✗
9 ✗	10 ✗	11 ✓	12 ✗
13 ✓	14 ✗	15 ✗	16 ✗
17 ✗	18 ✓	19 ✓	20 ✓

3
1. Motion
2. Force
3. Gravity
4. Moon
5. Sun
6. Magnetism
7. Friction force
8. Air resistance
9. Parachute

4
1. moon
2. moon
3. push
4. slows down
5. Magnetism
6. Air resistance
7. direction

5 (A)
1. Earth's gravity, orbit.
2. Sun
3. center
4. moon's gravity

(B)
1. less
2. Force
3. Gravity, magnetism
4. space
5. more

6
1. magnetism
2. push

7
1. Sun
2. Moon

8 (A) Figure (2) (B).8

9
1. Due to the Earth's gravity.
2. Because the magnet applies a force called magnetism to paper clips.
3. Due to the absence of gravity.
4. Due to the gravity that pulls the object down.
5. Because Earth has more mass than that of the moon.
6. Because air resistance pulls the parachute backward and slows down the skydiver's drop.

10
1. The gravity between Earth and the moon decreases, and the moon might float off into space.
2. The gravity between Earth and the moon decreases, and the moon might float off into space.
3. The magnet pulls the paper clips towards it.
4. The speed of the bike decreases due to the friction force.
5. Air resistance pulls the parachute backward and slows down the skydiver's drop.

Unit 4

Concept 2

1

1 b	2 a	3 b	4 d
5 a	6 c	7 a	8 a
9 d	10 c	11 c	12 a
13 a	14 d	15 c	16 c
17 c	18 b	19 d	20 c
21 b	22 d	23 c	24 b

2
1 ✗ 2 ✗ 3 ✓ 4 ✗
5 ✓ 6 ✗ 7 ✗ 8 ✗
9 ✗ 10 ✗ 11 ✗ 12 ✗
13 ✗ 14 ✓ 15 ✗ 16 ✓
17 ✗ 18 ✓

3
1 Earth's axis 2 24 hours
3 Jupiter 4 Solar system
5 Constellation 6 Full moon
7 New moon 8 Moon
9 Stars 10 Galaxy
11 Universe 12 Copernicus
13 Sun 14 Planetarium

4
1 counterclockwise
2 different
3 oval (elliptical) 4 24
5 First quarter 6 Sun
7 moons 8 dome

5
(A) 1 day, night 2 middle
3 planets, moon
4 reflects
(B) 1 tilt 2 west, east
3 axis, 24 hours
4 Sun
(C) 1 amount of sunlight, Sun's position
2 pattern 3 shortest
4 east
(D) 1 heat, light
2 hydrogen, helium

6
1 Day and Night
2 Cycle of four seasons

7
(A) 1 e 2 a 3 b 4 c
5 d
(B) 1 d 2 a 3 b 4 c

8
1 ✓ 2 ✗ 3 ✓ 4 ✗

9
1 ✓ 2 ✗ 3 ✗ 4 ✓

10
1 ✓ 2 ✗ 3 ✓ 4 ✗

11
1 ✓ 2 ✗ 3 ✗ 4 ✓
5 ✗ 6 ✗

12
1 Due to the rotation of Earth around its axis once a day.
2 Due to the revolution of the Earth around the Sun.
3 Due to the tilt of Earth on its axis.
4 Because Earth rotates on its axis slower than Jupiter.
5 Because we are spinning at the same speed of the Earth's rotation.
6 Due to the revolution of the Earth around the Sun.
7 Because they consist of superhot gases.
8 Because it reflects sunlight falling on it.
9 Due to the moon's revolution around Earth in an oval path.
10 Due to the rotation of Earth on its axis once a day.

13
1 It causes the cycle of day and night.
2 This half of Earth has day.
3 Cycle of day and night won't occur.
4 The length of day on Earth and Jupiter will be equal.
5 They won't be bright in the night sky.
6 Planets and moons in the solar system will float off into space.

Government Model Exams Answers

1 Cairo – Heliopolis Administration

Question 1
(A) 1 c 2 a 3 c 4 b
(B) Stars consist of hydrogen and helium gases.

Question 2
(A) 1 ✓ 2 ✗ 3 ✗ 4 ✓
(B) Because water causes weathering and erosion of rocks.

Question 3
(A) 1 estuary 2 Jupiter
3 Friction
4 living organisms
(B) The cycle of day and night will not happen.

2 Cairo – Madinet Nasr Administration

Question 1
(A) 1 c 2 b 3 c 4 c
(B) Because the Sun is the closest star in our solar system, while the other stars far away from us. So, the Sun looks much larger to us than other stars.

Question 2
(A) 1 ✓ 2 ✗ 3 ✓ 4 ✓
(B) Its gravity will decrease to half.

Question 3
(A) 1 solar system
2 day and night
3 harmful 4 electricity
(B) Oceans

3 Cairo – Nozha Administration

Question 1
(A) 1 b 2 c 3 d 4 c
(B) Because the Earth has a greater mass than the moon.

Question 2
(A) 1 ✗ 2 ✓ 3 ✓ 4 ✗
(B) The cycle of day and night will not be happened.

Question 3
(A) 1 decrease 2 Jupiter
3 estuary 4 Universe
(B) The solar system

4 Giza - Al Haram Administration

Question 1
(A) 1 c 2 a 3 a 4 a
(B) reflects

Question 2
(A) 1 ✓ 2 ✗ 3 ✓ 4 ✓
(B) Moon

Question 3
(A) 1 b 2 d 3 a 4 c
(B) The Earth will not orbit around the Sun in fixed orbit and float off into space.

5 Giza - 6 October Administration

Question 1
(A) 1 a 2 b 3 a 4 a
(B) Because the Earth revolves around the Sun.

Question 2
(A) 1 Jupiter 2 estuary
3 24 hours 4 biosphere
(B) An oval

Question 3

(A) 1 ✓ 2 ✗ 3 ✗ 4 ✗

(B) Paper clips will be attracted to the magnet.

6 Giza- Atfih Administration

Question 1

(A) 1 ✗ 2 ✓ 3 ✗ 4 ✗

(B) The gravity between the moon and the Earth decreases to half.

Question 2

(A) 1 biosphere 2 its center 3 slows down 4 larger than

(B) Gulfs

Question 3

(A) 1 d 2 a 3 b 4 c

(B) Because the most amount of fresh water on Earth are found in the large sheets of ice called glaciers.

7 Qualyobia - Atfih Administration

Question 1

(A) 1 Salt 2 Rocks 3 Lakes 4 its center

(B) Oceans

Question 2

(A) 1 ✗ 2 ✗ 3 ✓ 4 ✓

(B) An estuary will be formed.

Question 3

(A) 1 Biosphere 2 Watershed 3 Solar system 4 Force

(B) Because the Earth has a greater gravity than that of the moon.

8 Alexandria – East Zone

Question 1

(A) 1 c 2 b 3 a 4 b

(B) star

Question 2

(A) 1 estuary 2 magnetism 3 the Sun 4 shortest

(B) To conserve water because the fresh water on the Earth is limited.

Question 3

(A) 1 ✓ 2 ✗ 3 ✗ 4 ✓

(B) Gravity force

9 Alexandria – Montazah Zone

Question 1

(A) 1 Earth 2 biosphere 3 pulling 4 fresh water

(B) atmosphere

Question 2

(A) 1 Axis 2 Salt water 3 Magnetism 4 Lakes

(B) Rivers

Question 3

(A) 1 b 2 a 3 d 4 c

(B) Due to the Earth's revolution around the Sun.

10 Alexandria – Middle Zone

Question 1

(A) 1 ✗ 2 ✓ 3 ✗ 4 ✗

(B) Water

Question 2

(A) 1 wetland 2 east 3 Molten rocks - rocks 4 force

(B) Esturay

Question 3

(A) 1 b 2 b 3 c 4 b

(B) Because water causes the weathering process, which is responsible for breaking down rocks, and erosion process, which is responsible for the movement of broken rocks from one place to another.

11 Suez – South Suez Administration

Question 1

(A) 1 b 2 b 3 c 4 a

(B) Because Earth has a greater gravity than the moon.

Question 2

(A) 1 star 2 atmosphere
3 an oval 4 ice

(B) Fresh water: River or Groundwater
Salt water: Ocean or Seas

Question 3

(A) 1 Dolphins 2 hydrogen
3 estuary 4 force

(B) The cycle of day and night will happen.

12 Behaira – Rashid Administration

Question 1

(A) 1 Animals 2 Lakes
3 Sun
4 gravity of Earth

(B) The planets will float off into space.

Question 2

(A) 1 Orbits 2 Geosphere
3 universe 4 24

(B) Because it has a high concentration of natural salts.

Question 3

(A) 1 ✓ 2 ✗ 3 ✗ 4 ✗

(B) 1 Sun 2 Moon

13 Menofia – El-Bagour Administration

Question 1

(A) 1 b 2 c 3 b 4 d

(B) Because the paper clip is made up of metal that is attracted to the magnet by magnetism.

Question 2

(A) 1 ✓ 2 ✗ 3 ✗ 4 ✓

(B) The speed of the skydiver during landing will decrease due to air resistance that acts against the gravity force.

Question 3

(A) 1 Groundwater 2 The moon
3 Axis

(B) 1 b 2 a 3 d 4 c



14 Sharkia – El-Zakazek Administration

Question 1

(A) 1 b 2 a 3 c 4 d

(B) Because the Earth has a greater mass than the Moon.

Question 2

(A) 1 ✗ 2 ✓ 3 ✗ 4 ✓

(B) reflects

Question 3

(A) 1 b 2 d 3 a 4 c

(B) The cycle of day and night will happen.

15 Aswan – Eductional Zone

Question 1

(A) 1 a 2 a 3 b 4 c

(B) Because the Earth has a greater mass than the moon.

Question 2

(A) 1 galaxy 2 death
3 east – sets 4 fresh

(B) Because the air resistance that acts on his parachute against gravity helps him slow down his landing. So, it lands safely.

Question 3

(A) 1 ✗ 2 ✗ 3 ✗ 4 ✗

(B) It forms the shortest shadow because the Sun at noon is high in the sky.